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HELMINTHOLOGICAL ABSTRACTS

A quarterly review of world literature on helminths and their vectors especially in relation to veterinary, medical and plant pathology, soil science, fisheries, fresh-water and marine zoology, taxonomy and geographical distribution.



Prepared by the
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From Volume 29, which was issued during 1960, each volume of *Helminthological Abstracts* will consist of four quarterly parts appearing in March, June, September and December. Each part includes abstracts of all papers which come to hand during the relevant period of preparation, regardless of their date of publication and, in Volume 29 is provided with author indexes only; from Volume 30 a subject index will be included in each part. A title page and author and subject indexes for each volume will also be issued.

The earlier arrangement by which abstracts of the literature published in each year were brought into a single volume when bound terminates with the completion of Volume 27 (1958).

Volume 28 Part 1 contained abstracts of such literature published in 1959 as came to hand before September of that year. The remaining parts are being compiled from 1959 references and the supplementary titles of helminthological books and articles which came to the attention of the Bureau too late for inclusion in the relevant annual volume under the old scheme.

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HELMINTHOLOGICAL ABSTRACTS

Vol. 30, Part 3

ABSTRACTS

When an address accompanies an abstract, it is that of the first author.

MEDICAL HELMINTHOLOGY

Surveys

- 1274—HENDERSON, H. E., 1957. [Division of Laboratories, Parasitology Section, Texas State Health Department, Austin, Texas, U.S.A.] "Incidence and intensity of hookworm infestation in certain East Texas counties with comparison of technics." **Texas Reports on Biology and Medicine**, 15 (2), 283-291.

Henderson examined 8,308 faecal specimens from 11 eastern Texas counties by the zinc sulphate flotation technique. 33.4% showed hookworm infection, with a range from 19.2% to 51.3% for individual counties. In 406 negroes examined there was an incidence of 1.7%. Intensity as revealed by the Stoll technique on the 2,373 positive specimens showed 51.8% very light, 23.5% light and 17.1% moderate, 4.3% heavy and 3.3% very heavy. A comparison of techniques employed on 1,227 specimens showed 97.6% of positives by the zinc sulphate flotation technique and 57.8% by the direct smear technique. Although the Stoll technique was not used on specimens negative to the other techniques, it disclosed eggs in 91.8% of those specimens positive by one or both other techniques.

J. W. Smith

- 1275—IYENGAR, M. O. T., 1957. "A report on an investigation on filariasis in the Cook Islands." Nouméa, New Caledonia: South Pacific Commission, Technical Information Circular No. 21, 13 pp.

During a visit to the Southern Group of the Cook Islands, Iyengar took the blood of 1,851 persons and examined them for gross signs of filarial disease. In 1956 Iyengar visited Aitutaki and Rarotonga in the Southern Group of the Cook Islands to determine the incidence of filarial infection and of gross manifestations of filarial disease. Of 1,297 persons examined in the seven villages of Aitutaki Island 271 (20.9%) had microfilariae in the peripheral blood and 48 (3.7%) showed gross filarial lesions. In the three villages of Rarotonga Island the microfilarial incidence in 554 persons was 23.3% and 4.3% had visible signs of filarial disease. The actual incidence in the population is probably much higher as a large number of the samples were taken from children. The infection was of the non-periodic form of *Wuchereria bancrofti* (vel *W. pacifica*). Of the three species of mosquitoes which occur in these islands 984 specimens were caught and dissected. 119 out of 891 *Aedes polynesiensis* showed developmental stages of filaria worms. Seven out of 65 *Culex fatigans* were infected but none of the larvae had passed the first day phase and many of them were moribund. Two found in 28 *Culex annulirostris* showed similar features. Artificial containers of rain water were the main breeding places for *A. polynesiensis* but on other islands where the villages are surrounded by coconut plantations the shells of rat-damaged coconuts provide additional breeding places for mosquitoes. Attention is drawn to the failure to enforce the Mosquito Control Ordinance of 1947.

R. T. Leiper

1276—McCULLOUGH, F. S., 1957. [Department of Zoology, Queen's University of Belfast, Northern Ireland.] "The distribution of human schistosomiasis and the potential snail hosts in Ghana." *West African Medical Journal*, **6** (3), 87-97.

McCullough gives the distribution of *Bulinus* (*Physopsis*) *globosus*, *B. (B.) truncatus rohlfsi* and *B. (B.) forskalii* in Ghana. The last named is a doubtful potential intermediate host of *Schistosoma haematobium*. The distribution of *Biomphalaria pfeifferi gaudi* as an intermediate host of *S. mansoni* is also given. The incidence and distribution of intestinal schistosomiasis is considerably more restricted than that of urinary schistosomiasis. Tables give a comparison of the number of patients treated for schistosomiasis with the number treated for other ailments at hospitals in Ghana from 1927 to 1953, the incidence of *S. mansoni* infection recorded during routine examination of stool in some hospitals in Ghana, and the incidence of *S. haematobium* and *S. mansoni* infection recorded during 1950 and 1951 at hospital laboratories in Ghana. Maps of Ghana accompany the text. J. W. Smith

1277—MUMFORD, E. P., 1960. [Professor of Biology, Dominican College of San Rafael, California, U.S.A.] "The distribution of some parasites of man in the Near and Middle East." *Journal of Tropical Medicine and Hygiene*, **63** (4), 77-85.

Mumford annotates, from papers published since 1951, the various helminths known to occur in man in Egypt, Israel, Jordan, Lebanon, Syria, Iraq and Saudi Arabia, and adds additional information received as personal communications from: (i) Mofidi who states that dicrocoeliasis and *Fasciola hepatica* are wide-spread among animals in Iran but only three cases of *F. hepatica* have been observed in man; hydatid disease is wide-spread; (ii) Yeni-Komshian has observed a few cases of filariasis bancrofti in people who have not been out of Lebanon and Syria; (iii) Schwabe has seen a few cases of *Wuchereria bancrofti* in the local population of Lebanon but the infection has apparently died out owing to the insufficiency of a local vector; (iv) Oyton & Wray state that *Necator* is common along the Black Sea coasts; (v) Pirc reported (1958) to the author that 24,866 cases of hookworm had been seen in Iran; (vi) Unat (1959) stated that there is a focus of schistosomiasis in part of Mardin on the Syrian border of Turkey; (vii) Schwabe (1959) reported that *Taenia saginata* is the most important intestinal helminth in Lebanon and that *Trichostrongylus* occurred more frequently than *Ancylostoma* in patients at the American University Hospital in Beirut, while (viii) Yeni-Komshian (1958) had seen it in neighbouring countries especially in Syria and Iraq. [The dates given are apparently those of the personal communications received by Mumford.] R. T. Leiper

Trematoda

1278—ANON., 1957. "Liver flukes in man." *Lancet*, Year 1957, **2** (7001), 882.

***1279**—ALMEIDA JÚNIOR, N. DE, 1957. "Métodos de diagnostico da esquistossomose mansônica." *Resenha Clínico-Científica*. São Paulo, **27** (3/4), 95-105.

***1280**—ALMEIDA JÚNIOR, N. DE, 1957. "Resultados do tratamento cirúrgico na forma hepatoesplênica da esquistossomose mansônica. Estudo de 17 casos." *Revista Brasileira de Gastroenterologia*, **9** (3), 115-122.

***1281**—BOGLIOLO, L., 1957. "As bases anatômicas da esquistossomose mansônica hepatoesplênica (forma hepatoesplênica da esquistossomose) e suas aplicações a clínica." *Resenha Clínico-Científica*. São Paulo, **27** (3/4), 86-93.

1282—BOGLIOLO, L., 1957. "A esplenoportografia na esquistossomose mansônica hepatoesplênica, forma de Symmers." *Revista da Associação Médica Brasileira*, **3** (3), 263-269. [English summary pp. 268-269.]

1283—CARDOSO, W., 1957. "As proteínas séricas na esquistossomose hepatoesplênica." *Medicina, Cirurgia, Farmácia*. Rio de Janeiro, No. 249, pp. 27-37.

- 1284**—CORDERO, R. L., McCULLOUGH, K., DUMEYER, W. H. & BRIELE, H. A., 1957. [Peninsula General Hospital, Salisbury, Maryland, U.S.A.] "Schistosomiasis mansoni in Maryland. Report of case." *Maryland State Medical Journal*, **6** (3), 152-154.
- 1285**—COUDERT, J. & TRIOZON, F., 1957. "Aperçus nouveaux sur l'épidémiologie de la distomatose hépatique dans la région lyonnaise." *Presse Médicale*, **65** (71), 1586-1588.
- ***1286**—DEFESCHE, A. J., 1957. "Zur Diagnostik und Therapie der Bilharziose." *Medizinische. Stuttgart*, Year 1957, No. 44, pp. 1617-1618.
- 1287**—DEPAILLAT, A., 1957. "A propos d'une vingtaine de cas récents de distomatose humaine en Corrèze." *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, 4e série, **73** (29/30), 973-978.
- 1288**—DESCHIENS, R. & BÉNEX, J., 1960. "Etude électrophorétique du sérum sanguin dans les bilharzioses humaines." *Comptes Rendus des Séances de l'Académie des Sciences. Paris*, **251** (19), 2103-2104.
- An electrophoretic study of human blood serum showed that it was possible to distinguish, on the basis of the proteinogram, between normal subjects, those affected with *Fasciola hepatica* and those affected with schistosomiasis. It was not possible to distinguish between urinary and intestinal schistosomiasis by this method. W. M. Fitzsimmons
- 1289**—DUPONT, V., BERNARD, E., SOUBRANE, J., HALLÉ, B. & RICHIR, C., 1957. "Bilharziose à *Schistosoma japonicum* à forme hépato-splénique révélée par une grande hématémèse." *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, 4e série, **73** (27/28), 933-941.
- 1290**—FARID, Z., GREER, J. W. & EL NAGAH, A. M., 1957. [Department of Clinical Investigation, U.S. Naval Medical Research Unit No. 3, Cairo, Egypt.] "Cardiopulmonary studies in schistosomiasis. III. Pulmonary function tests, hemodynamic and pharmacodynamic studies in bilharzial cor pulmonale." *Journal Médical Libanais*, **10** (5), 380-397. [French summary p. 392.]
- 1291**—FARID, Z. ET AL., 1959. [Department of Clinical Investigation, U.S. Naval Medical Research Unit, Cairo, Egypt.] "Chronic pulmonary schistosomiasis." *American Review of Tuberculosis and Pulmonary Diseases*, **79** (2), 119-133.
- Farid *et al.* describes the vascular and parenchymatous lesions in pulmonary schistosomiasis. 15 patients aged 17 to 50 years, two of whom were female, were studied. 13 had *Schistosoma mansoni* ova in the stools and seven had *S. haematobium* also; in one patient *S. mansoni* ova were found in the urine, and four had *S. haematobium*; four had *S. mansoni* eggs in the sputum and one had *S. haematobium*. All the patients had dyspnoea gradually increasing in severity and the chest X-ray appearances are considered characteristic. The authors conclude that chronic pulmonary schistosomiasis affects the pulmonary vascular system mainly, although mild ventilatory insufficiency is also present in most patients. W. K. Dunscombe
- ***1292**—FERREIRA, J. M., 1957. "Aspectos endócrinos da esquistossomose mansônica hépato-esplênica." Thesis, São Paulo, 173 pp.
- ***1293**—FILIZZOLA FILHO, B., 1957. "Contribuição da proctologia no estudo da esquistossomose mansônica." *Resenha Clínico-Científica. São Paulo*, **27** (3/4), 116-123.
- 1294**—FIORILLO, A. M., 1957. [Departamento de Clínica Médica da Faculdade de Medicina de Ribeirão Preto, Brazil.] "Estudo eletroforético das proteínas séricas na esquistossomose mansoni, forma hépato-esplênica." Thesis, Universidade de São Paulo, 31 pp. [English summary pp. 29-30.]
- 1295**—FRIEDMAN, E. A. & SHOOKHOFF, H. B., 1957. [Department of Health, City of New York, Bureaus of Preventable Diseases & Laboratories, Division of Tropical Diseases, U.S.A.] "*Schistosoma mansoni* infections in hospitalized Puerto Rican patients." *New York State Journal of Medicine*, **57** (24), 3994-3996.

- 1296—GLOVER, M. A. & ALICATA, J. E., 1957. [University of Hawaii.] "Intestinal heterophyidiasis." **Hawaii Medical Journal**, 16 (6), 636, 688.
- 1297—GREER, J. W., FARID, Z. & EL NAGAH, A. M., 1957. [Department of Clinical Investigation, U.S. Naval Medical Research Unit No. 3, Cairo, Egypt.] "Cardiopulmonary studies in schistosomiasis. II. The clinical aspects of bilharzial cor pulmonale." **Journal Médical Libanais**, 10 (5), 366-379. [French summary pp. 377-378.]
- 1298—HALAWANI, A., ABDALLA, A. & BADRAN, A., 1960. [World Health Organization, Alexandria, Egypt.] "The relation between schistosomiasis and the urinary *Salmonella* carrier state." **American Journal of Tropical Medicine and Hygiene**, 9 (4), 371-373.
Halawani *et al.* found that among urinary *Salmonella* carriers in Egypt there was a high incidence of urinary schistosomiasis. Working with 36 *Salmonella* carriers the authors found that treatment of this condition with chloramphenicol was apparently less effective in the presence of urinary schistosomiasis. Treating urinary schistosomiasis was found to increase the response of *Salmonella* carriers to chloramphenicol. J. W. Smith
- 1299—HANDFORD, S. W., 1961. [Naval Medical Research Institute, Bethesda 14, Maryland, U.S.A.] "Blood ammonia levels in patients with advanced hepatic fibrosis associated with schistosomiasis." **American Journal of Tropical Medicine and Hygiene**, 10 (1), 33-36.
Routine hepatic function tests (BSP clearance, thymol turbidity and bilirubin index) were elevated in each of 29 patients with advanced hepatic fibrosis associated with *Schistosoma mansoni* and *S. haematobium* infections. These individuals also suffered from malnutrition and were, or had been, infected with numerous other enteric parasites. Blood ammonia nitrogen, urea, glutamine and keto acid content in these cases showed no significant difference from that found in 14 sick controls (without advanced hepatic disorders) and 20 clinically healthy controls. Handford discusses the metabolism of ammonia and related compounds in cases of hepatic failure. J. W. Smith
- 1300—HASHEM, M., 1957. [Kasr El Aini Faculty of Medicine, Cairo, Egypt.] "The present status of the so-called 'Egyptian splenomegaly'." **Journal of the Egyptian Medical Association**, 40 (12), 860-869.
After presenting the synonymy, definition and history of the so-called Egyptian splenomegaly, Hashem goes on to discuss at length the evidence for and against the bilharzial origin of this syndrome. J. W. Smith
- 1301—ISHAK, K. G. & LE GOLVAN, P. C., 1957. [Department of Pathology, U.S. Naval Medical Research Unit No. 3, Abbassia, Cairo, Egypt.] "Cardiopulmonary schistosomiasis. Pathology and pathogenesis." **Journal Médical Libanais**, 10 (5), 347-365. [French summary pp. 359-361.]
- 1302—ISHIDA, H., 1960. [Department of Pathology, Osaka Medical College, Osaka, Japan.] [Studies on the dermatitis-producing *Cercaria mieensis* n.sp. in man. III. On the pathogenicity of *Cercaria mieensis* n.sp.] **Japanese Journal of Parasitology**, 9 (6), 730-734. [In Japanese: English summary p. 734.]
Ishida demonstrated experimentally that *Cercaria mieensis* could produce dermatitis which was clinically and histopathologically similar to cercarial dermatitis. It is concluded that *C. mieensis* was the cause of dermatitis amongst people working in the rice paddies in Mie Prefecture. [For other abstracts in this series see Nos. 1754 & 1755 below.] Y. Yamao
- 1303—IWAKAMI, S., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on schistosome dermatitis in Dozen region in Oki Islands. II. Clinical symptoms, epidemiology and prevention of paddy-field dermatitis in Oki Islands.] **Japanese Journal of Parasitology**, 9 (6), 768-777. [In Japanese: English summary p. 777.]
Dermatitis in rice fields in Oki Islands was characterized by the rapid development of an urticarial wheal accompanied by intense itching, which developed at point of contact with infected water. No dermatitis occurred in those who worked in the paddy-field without *Lymnaea japonica*. These facts indicated that the dermatitis in Oki Islands was due to schistosome cercariae. *Lymnaea japonica* did not survive more than seven days, either on or in dry

soil. Ploughing deeply, keeping the paddy-field dry and using sodium pentachlorophenate (1:50,000) and parathion (1:5,000) solutions were considered to be effective control measures against the snails.

Y. Yamao

1304—KATAMINE, D., SAKAGUCHI, Y., INOUE, S. & MOTOMURA, K., 1960. [Clinical Department, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] [Studies on paragonimiasis in Amakusa Island. I. Endemiological survey on human paragonimiasis in Amakusa-Cho.] **Endemic Diseases Bulletin of Nagasaki University**, 2 (3), 212–221. [In Japanese: English summary pp. 220–221.]

From 1958 to 1959, an endemiological survey of human paragonimiasis in Amakusa-Cho, Kumamoto Prefecture, was performed on children from 6 years to 14 years old, by the intradermal test, the examination of faeces and sputum for eggs, and roentgenological examination. The highest percentage positive to the intradermal test (8.42%) was in Takahama district. In 27 out of 82 persons positive to this test, *Paragonimus* eggs were found in sputa and faeces. The average infection rate of *P. westermani* in *Eriocheir japonicus* was 19.1% but the maximum was 92.1% in Takahama district.

Y. Yamao

1305—KISSEL, P., LAMY, P., DEBRY, G. & SCHMITT, J., 1957. “Éosinophilie sanguine symptomatique d’une distomatose à *Fasciola hepatica*. Incidence familiale de la maladie.” **Revue Médicale de Nancy**, 82, 304–314.

1306—MAKAR, N., 1957. “A note on the pathogenesis of cancer in the bilharzial bladder.” **British Journal of Surgery**, 45 (191), 240–250.

1307—MARCINIAK, R., 1957. [Klinika Radiologiczna, A.M. we Wrocławiu, Poland.] “Semiotyka radiologiczna paragonimiozy płuc na podstawie obserwacji schorzenia u dzieci koreańskich w Polsce.” [X-ray signs of pulmonary paragonimiasis.] **Polski Przegląd Radiologiczny**, 21 (1), 41–50. [English & Russian summaries pp. 48–49.]

***1308**—MENDES, F., 1957. “Esquistossomose hepatoesplênica.” **Resenha Clínico-Científica. São Paulo**, 27 (3/4), 107–114.

1309—MIRER, V. I., 1958. [Kharkov, Sumskaya ul., d. 110, kv.20, U.S.S.R.] [The aetiology and treatment of acute cholecystitis caused by *Opisthorchis felinus*.] **Vestnik Khirurgii Imeni Grekova**, 81 (9), 139–140. [In Russian.]

***1310**—MOUSSA, K., 1958. “Entdeckung von Bilharziosis der Cervix uteri durch Routinekolposkopie.” **Geburtshilfe und Frauenheilkunde**, 18 (6), 877–878.

1311—NELSON, G. S., 1960. [Division of Insect-Borne Diseases, Medical Research Laboratory, Nairobi, Kenya.] “Schistosome infections as zoonoses in Africa.” **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (4), 301–316. [Discussion pp. 317–324.]

Excluding those schistosomes which merely caused cercarial dermatitis, eight species and two varieties have been reported as parasites of man in Africa. Nelson discusses the significance of the occurrence of *Schistosoma haematobium* and *S. mansoni* in baboons and monkeys in Kenya and Uganda. The evidence which he has collected, indicates that these animals are not primary maintenance hosts but probably acquire their infections from waters contaminated by man, for those animals collected from the uninhabited National Game Park of Nairobi and Tsavo have proved, at autopsy, to be free from schistosome infections.

R. T. Leiper

1312—PESSÔA, S. B. & AMORIM, J. P., 1957. “Notas sobre a esquistossomose mansônica em algumas localidades de Alagoas.” **Revista Brasileira de Medicina**, 14 (6), 420–422.

1313—PESTER, F. R. N., 1960. [London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1.] “Three recent cases of human fascioliasis in Britain.” [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (4), 289.

*1314—PINOTTI, M., 1957. "O estado atual e futuro do combate a esquistossomose no Brasil." *Arquivos Brasileiros de Medicina Naval*, 18 (62), 5105-5130.

1315—PITCHFORD, R. J., 1961. [S.A. Council for Scientific & Industrial Research, Bilharzia Field Unit, Nelspruit, South Africa.] "Observations on a possible hybrid between the two schistosomes *S. haematobium* and *S. matthei*." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (1), 44-51.

In the Komatipoort area in the eastern Transvaal *Schistosoma haematobium* eggs are found in 80% to 90% of the children and those of *S. matthei* in about 80% of the cattle and 10% to 40% of the village populations. The local canals and dams are used extensively both by the natives and the cattle. The adults of these two schistosomes appear morphologically identical, the evidence differentiating them being based on the morphology of the eggs and the fact that in the Transvaal *S. matthei* occurs as a natural infection in cattle, sheep, goats, wild rodents, impala, blue wildebeest and zebra, whereas man is the only natural host of *S. haematobium*. At Komatipoort a young girl was found discharging numerous eggs of *S. matthei* and *S. haematobium* type in her urine. The *S. matthei* eggs were separated and the miracidia used to infect laboratory-bred *Physopsis* sp. and subsequently white mice and *Mastomys natalensis*, with the result that extra-uterine eggs easily distinguishable from *S. matthei* and *S. haematobium* were recovered from these animals in the first and third generation, while the eggs obtained from the second generation differed from those of *S. matthei* in length only. In the fourth generation the eggs passed were obviously those of *S. matthei* and *S. haematobium* with all intervening morphological types. Pitchford discusses the probability that the original "*S. matthei* eggs" in the girl's urine were (i) malformed *S. haematobium* eggs, (ii) pure *S. matthei* eggs from paired *S. matthei* adults, or (iii) eggs of hybrids of *S. matthei* and *S. haematobium*. It is suggested that these findings are best explained by hybridization between *S. haematobium* and *S. matthei* occurring naturally in man in the eastern Transvaal, where both infections are prevalent.

R. T. Leiper

1316—PRATA, A., 1957. "Biópsia retal na esquistossomose mansoni. Bases e aplicações no diagnóstico e tratamento." *Rio de Janeiro: Serviço Nacional de Educação Sanitária*, 197 pp.

1317—RYBAKOWSKA, U., PUŁKO, W. & DYLIKOWSKA, L., 1957. [Specjalistyczny Szpital Dziecięcy, Bytom, Poland.] "Motylica wątrobowa z zespołem Loefflera u dziewczynki 6-letniej." [*Fasciola hepatica* with Loeffler's syndrome in a six-year-old girl.] *Pediatrica Polska*, 32 (2), 173-177. [English summary p. 177.]

1318—SCOTT, J. A., 1957. [Laboratory of Helminth Research, Department of Preventive Medicine and Public Health, University of Texas Medical Branch, Galveston, Texas, U.S.A.] "Egg counts as estimates of intensity of infection with *Schistosoma haematobium*." *Texas Reports on Biology and Medicine*, 15 (3), 425-430.

Scott carried out egg counts on individual specimens of urine from 28 young men infected with *Schistosoma haematobium*, and discusses the coefficient of variation between individual specimens.

J. W. Smith

1319—SHAFEI, A. Z., 1957. "The relationship of cancer of the rectum to intestinal amoebiasis and bilharziasis. A case report." *Journal of the Egyptian Medical Association*, 40 (12), 856-859.

*1320—SILVA, J. R. DA, 1957. "Critério de cura na esquistossomose mansônica." *Resenha Clínico-Científica. São Paulo*, 27 (3/4), 125-127.

1321—SILVA, J. R. DA, 1957. [Faculty of Medical Science, U.D.F., Rio de Janeiro, Brazil.] "Valor e importância do tratamento específico da esquistossomose mansoni, no campo da profilaxia." *Revista Brasileira de Medicina*, 14 (7), 524-526.

Da Silva discusses the value of mass treatment (irrespective of whether clinical cases or not) in areas where schistosomiasis mansoni is endemic as a means of reducing its incidence and, incidentally, preventing secondary complications of the disease and promoting generally improved community health. Most examples quoted show that a reduction of incidence occurs after mass treatments. The difficulties of its application are stressed as well as the desirability of its combination with simultaneous vector eradication.

W. M. Fitzsimmons

- 1322**—SILVA, J. R. DA & DIAS, C. B., 1957. "O gluconato de antimonio-III e sodio no tratamento da esquistossomíase mansônica." *Revista da Associação Médica Brasileira*, **3** (1), 33–36. [English summary p. 35.]
- 1323**—TSUZI, Y. ET AL., 1960. [Department of Surgery, Nagasaki University School of Medicine, Nagasaki, Japan.] [Two cases of paragonimiasis cerebri.] *Endemic Diseases Bulletin of Nagasaki University*, **2** (1), 46–52. [In Japanese: English summary p. 52.]
- 1324**—VILAR BONET, J., 1957. "Hipertensión portal en la schistosomiasis mansoni." *Revista Española de las Enfermedades del Aparato Digestivo y de la Nutrición*, **16** (3), 402–404.
- 1325**—YOSHIDA, Y., ET AL., 1960. [Department of Medical Zoology, Kyoto Prefectural University of Medicine, Kyoto, Japan.] [Case report of human infection with *Fasciola* sp. and its treatment.] *Japanese Journal of Parasitology*, **9** (6), 711–716. [In Japanese: English summary p. 716.]
- 1326**—ZGLICZYŃSKI, L., CZECHOWSKA, Z., HAN-KIU-UON & BOWKIEWICZ, J., 1957. "Paragonimiasis pulmonum. Porównanie zmian anatomopatologicznych z objawami radiologicznymi u zwierząt doświadczalnych i u ludzi." [Pulmonary paragonimiasis. A comparison of the anatomopathological changes and X-ray findings in experimental animals and in man.] *Polski Przegląd Radiologiczny*, **21** (1), 51–62. [English & Russian summaries p. 61.]

Cestoda

- 1327**—ANON., 1957. "Taeniasis." [Editorial.] *Journal of the Indian Medical Association*, **29** (3), 117–118.
- ***1328**—ANTTONEN, V. M., 1957. "Muutamia havaintoja leveän heisimadon häädöstä." [Some observations on drugs for evacuation of tapeworms.] *Duodecim*, **73** (3), 132–136.
- 1329**—AYKAN, F., 1957. "Tenya tedavisinde atebrin ve acranil. (115 vak'a üzerinde etüd)." [Treatment of taeniasis with atebrin and acranil. 115 cases.] *Türk Tıp Cemiyeti Mecmuası*, **23** (4), 195–199.
- 1330**—BHADURI, N. V., ARORA, U. S. & CHATTERJI, M. L., 1958. "Dichlorophen in the treatment of *Taenia saginata* infection of man." *Bulletin of the Calcutta School of Tropical Medicine*, **6** (1), 19.
- Dichlorophen (5:5 dichloro 2:2 dihydroxydiphenylmethane) in tablets of 0.5 gm. each was given to nine adults and three children with *Taenia saginata* infection in the dosage of 0.5 gm. per 14 lb. to 16 lb. body-weight. All the stools were collected for three days. Broken-down and distorted segments were expelled but no heads were passed and all of the eight cases re-examined three months later were found still infected.
R. T. Leiper
- ***1331**—BORTAGARAY, C. A. & ERRANDONEA, J., 1958. "Quiste hidático de tiroides." *Boletín de la Sociedad de Cirugía del Uruguay*, **29** (1), 5–7.
- ***1332**—BOTTINI, A. C., 1958. "A proposito de quistes hidáticos de diafragma." *Boletines y Trabajos. Sociedad de Cirugía de Buenos Aires*, **42** (14), 391–396.
- 1333**—BOURGEON, R. & PIÉTRI, H., 1957. "Aspects diagnostiques et thérapeutiques actuels du problème de l'échinococcose hépatique." *Semaine des Hôpitaux de Paris*, **33** (14), 910–911.
- ***1334**—BREA, M. M., SANTAS, A. A. & GILARDON, A., 1958. "Quistes hidáticos del diafragma." *Boletines y Trabajos. Sociedad de Cirugía de Buenos Aires*, **42** (13), 371–386.
- ***1335**—BUENO, R., CAAMAÑO DIAZ, E. H. & ABALLEYRA, J. H., 1958. "Síndrome pilórico por quiste hidatídico de hígado." *Día Médico. Buenos Aires*, **30** (30), 1037–1038.
- ***1336**—D'ESHOUGUES, J. R. & HOUEL, J., 1957. "Réflexions sur le traitement chirurgical du kyste hydatique du poumon." *Semaine des Hôpitaux de Paris*, **33** (66), 3888–3897.

- *1337—ELLIOT, A., 1958. "Taeniasis och köttfärrsmet." *Svenska Läkartidningen*, 55 (16), 1126–1139.
- 1338—FITZPATRICK, S. C., 1957. "Hydatid cysts in paraspinal muscle compartments. Their tendency to invade the spinal canal." *Australian and New Zealand Journal of Surgery*, 27 (1), 31–34.
- *1339—GAMARSKI, J. & PINTO, I. DE S., 1958. "Cisticercose muscular e subcutânea no homem: revisão da literatura e apresentação de um caso." *Medicina, Cirurgia, Farmácia. Rio de Janeiro*, No. 268, pp. 335–360.
- 1340—GARABEDIAN, G. A., MATOSSIAN, R. M. & DJANIAN, A. Y., 1957. [Department of Bacteriology, American University of Beirut, Lebanon.] "Serologic diagnosis of hydatid disease by indirect hemagglutination." *Journal Médical Libanais*, 10 (4), 275–282. [French summary p. 282.]
- 1341—GIGITASHVILI, M. S., 1958. [Institut malyarii i meditsinskoi parazitologii, Ministerstvo zdavookhraneniya, Gruzinskaya SSR.] [Comparative efficacy of some compounds in the treatment of *Hymenolepis nana*.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 96–98. [In Russian.] Comparative treatments of *Hymenolepis nana* infection in 263 children and adults showed that pomegranate bark decoction was not inferior to filixan but its administration is not as simple. Acrichin failed to produce complete cures. N. Jones
- 1342—GORDADZE, G. N. & GIGITASHVILI, M. S., 1958. [Epilepsy in cases of *Hymenolepis nana* infection.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 114–118. [In Russian.]
- 1343—GORDIN, R. & ENARI, T. M., 1959. [IVth Medical University Clinic, Maria Hospital, Helsingfors, Finland.] "Lactic acid dehydrogenase in vitamin B₁₂ deficiency. Genuine pernicious anaemia and pernicious tapeworm anaemia." *Acta Haematologica*, 21 (1), 16–22. [French & German summaries p. 21.] Gordin & Enari found that the lactic dehydrogenase activity in the blood serum of patients with genuine pernicious anaemia or with pernicious tapeworm anaemia increased during periods of relapse. As the reticulocytosis and the concentration of vitamin B₁₂ in the serum increased, the lactic dehydrogenase activity decreased. There was no direct correlation between the haemoglobin and red cell values and enzyme activity. W. P. Rogers
- 1344—GÜRSEL, A. E. & NURLU, F., 1957. "Bir kist hidatik vak'asi." [Case of hydatid cyst.] *Türk Tıp Cemiyeti Mecmuası*, 23 (12), 693–696.
- 1345—KOROLINSKAYA, V. N., 1958. [The influence of *Hymenolepis* and *Giardia* infections on the course of chronic dysentery in children.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 167–170. [In Russian.]
- 1346—KUZNETSOVA, O. A. & USACHEVA, I. P., 1958. [Bashkirski meditsinski institut, U.S.S.R.] [Some data on the measures of control of *Hymenolepis* infections in the town of Ufa.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 181–184. [In Russian.] As *Hymenolepis nana* eggs reappeared in the faeces of children 15 to 105 days after treatment and most frequently after 15 days, the authors suggest that the results of treatment should be checked after 15 days and that worming should be preceded by appropriate preparation. N. Jones
- 1347—LAMMA, V., 1957. [Ufficio d'Igiene e Sanità del Comune di Roma, Italy.] "Contributo alla conoscenza dell'idatidosi del polmone attraverso l'indagine schermografica." *Lotta contro la Tuberculosis*. Rome, 27 (7/8), 685–689.
- 1348—LINCHENKO, I. F., 1961. [Bilateral pulmonary echinococcosis.] *Khirurgiya*. Moscow, 37 (1), 121–123. [In Russian.]

- *1349—MAKHLOUF, A., 1957. "Aspects anatomo-cliniques et considérations thérapeutiques sur le kyste hydatique au Liban." **Revue Médicale du Moyen-Orient**, 14 (4), 279-291.
- 1350—MASSEBOEUF, A., ACQUAVIVA, R., THEVENOT, C. & BARCHECHATH, C., 1957. [Centre de Neuro-Chirurgie des Hôpitaux du Maroc, Casablanca.] "Contribution à l'étude de l'échinococcose du névraxe." **Maroc Médical**, 36 (389), 897-917.
- 1351—MELISSINOS, K., 1957. "Remarques sur l'échinococcose du foie. Importance de l'allergie dans la pathogénie des symptômes de la maladie; le rôle des antihistaminiques de synthèse dans le traitement de l'échinococcose. (Étude de 55 cas.)." **Archives des Maladies de l'Appareil Digestif et des Maladies de la Nutrition**, 46 (12), 1287-1293. [English summary p. 1293.]
- *1352—MONTEIRO, R. C., 1957. "Tolerância e efeito de doses maciças de metoquina no tratamento da teníase. Estudo de 54 casos." **Revista Paulista de Medicina**, 51 (5), 382-386. [English summary.]
- 1353—MORELLINI, M., FERRI, L. & ROMEO, V., 1957. "Proposta di un nuovo antigene per la deviazione del complemento nella diagnosi sierologica dell'echinococcosi." **Policlinico (Sezione Pratica)**, Rome, 64 (34), 1217-1224. [English & French summaries p. 1224.]
- 1354—MUDZHIRI, M. S., 1958. [Treatment of cestode infections with the bark of *Punica granatum*.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 247-249. [In Russian.]
- 6 gm. to 8 gm. of aqueous extract of *Punica granatum* bark, given to two patients, expelled *Taenia saginata* without scoleces; 12 gm. given to two other patients expelled the tapeworms with scoleces. An acetic acid extract of this bark, given to 83 patients with taeniasis, at doses of 5 gm. to 12 gm. gave an average efficacy of 68.7%, while 10 gm. to 12 gm. had an efficacy of 87.5%. The drug was given in gelatin capsules and had no side effects. *Enterobius vermicularis* was also eliminated at the time of treatment. One to three courses of pomegranate bark extract also gave good results against *Hymenolepis* infection in 48 children. N. Jones
- 1355—PORRAS, T., 1957. "Curioso caso de equinococcosis torácica multiple de localización infrecuente en un mismo paciente." **Semana Médica**, Buenos Aires, 111 (2), 82-84.
- 1356—RAPAPORT, M. & MIERES, A., 1957. "Hidatidosis endocular." **Semana Médica**, Buenos Aires, 111 (7), 321-324. [English summary p. 324.]
- 1357—RAPAPORT, M., MIERES, A. & CICOLINI, J., 1957. "Hidatidosis endocular." **Revista de la Asociación Médica Argentina**, 71 (6), 189-191. [English summary p. 190.]
- *1358—SCHENA, A. T., 1958. "A propósito de bilirragia como consecuencia de operaciones de quiste hidatídico de hígado." **Boletines y Trabajos. Sociedad de Cirugía de Buenos Aires**, 42 (1), 2-3.
- 1359—SCHIEPPATI, E., 1958. "Quiste hidatídico pulmonar operado en 1904: evolución alejada." **Día Médico**, Buenos Aires, 30 (28), 970.
- 1360—SCHILLER, E. L., 1960. "Echinococcosis in North America." **Annals of Internal Medicine**, 52 (2), 464-476.
- 1361—SEATON, D. R., 1960. [Department of Clinical Tropical Medicine, Liverpool School of Tropical Medicine, Liverpool, England.] "On the use of dichlorophen as a taenifuge for *Taenia saginata*." **Annals of Tropical Medicine and Parasitology**, 54 (3), 338-340.
- Dichlorophen given orally, without ancillary treatment, at a rate of not less than 6 gm. for adults and 4 gm. for children, is effective in curing about 90% of infections with *Taenia saginata*. Seaton observed no untoward reactions to the drug in 34 patients, of whom 27 were cured. Since the parasite is passed in a disintegrated state cure cannot be assumed until three or four months later. Photographs show the difference in appearance of *T. saginata* after mepacrine expulsion and dichlorophen expulsion. J. W. Smith

- 1362**—SONZINI ASTUDILLO, C. P., 1957. "Gran quiste hidatídico de bazo que obstruye por compresión la vía biliar principal." *Prensa Médica Argentina*, **44** (36), 2780–2782. [English & French summaries p. 2782.]
- 1363**—SURIANU, P., MEDREA, B., POPA, M. & KARASSI, A., 1957. [Clinique Médicale III de Cluj, Rumania.] "Cysticercose cutanée à manifestations rhumatismales." *Presse Médicale*, **65** (67), 1505.
- 1364**—TASKIRAN, N., 1957. "Eine seltene Lokalisation einer Echinokokkus-Zyste." *Zentralblatt für Chirurgie*, **82** (51), 2090–2092.
- 1365**—TEPLICK, J. G., LABESS, M. & STEINBERG, S., 1957. [Kensington Hospital, Philadelphia, Pa., U.S.A.] "Echinococcosis of the kidney." *Journal of Urology*, **78** (4), 323–329.
- 1366**—THOMPSON, Jr., J. H., 1957. "Successful expulsion of tapeworms." *Minnesota Medicine*, **40** (12), 859–860.
- 1367**—WHITE, J. C., SWEET, W. H. & RICHARDSON, Jr., E. P., 1957. [Harvard Medical School, U.S.A.] "Cysticercosis cerebri. A diagnostic and therapeutic problem of increasing importance." *New England Journal of Medicine*, **256** (11), 479–486.
- 1368**—ZAIMI, A. & TAHAR, L., 1957. "Un cas de kyste hydatique du médiastin." *Semaine des Hôpitaux de Paris*, **33** (24), 1549–1551.
- *1369**—ZAVALETA, D. E., 1958. "A propósito de bilirragia como consecuencia de operaciones de quiste hidatídico del hígado." *Boletines y Trabajos. Sociedad de Cirugía de Buenos Aires*, **42** (3), 81–86.

Nematoda

- 1370**—ANON., 1957. "L'onchocercose. Fléau social en Afrique. Première opération prophylactique d'envergure en Afrique Equatoriale Française." *Paris: Comité de l'Entente Française*, 40 pp.
- 1371**—ADAMS, W., 1957. "Some studies on bancroftian filariasis in British Guiana." *Caribbean Medical Journal*, **19** (1/2), 16–17.
This is an abstract which merely states that the paper read dealt with a microfilarial survey made at 7.30 p.m. on over 30,000 individuals living in the unsewered suburbs of Georgetown and along the coastlands of British Guiana, and on the action of diethyltin on *Culex fatigans* after mass spraying in the village of Buxton, on the coast, but no results are quoted.
R. T. Leiper
- 1372**—ANANINA, N. O., 1958. [*Thominx* infection of the lungs.] *Sovetskaya Meditsina*, **22** (3), 136–137. [In Russian.]
Inhalations of Lugol's solution remained without effect in a human case of infection with *Thominx aerophilus*. Subsequently dithiazine was administered in two treatments of eight days and two of three days each, with intervals of four to six days between each. The daily dose of the drug was 0.3 gm. to 0.4 gm. As a result the general condition improved, the number of parasite's eggs in the sputum decreased and two months later a complete cure and disappearance of eggs followed. Nausea and headaches occurred during the treatment as side effects.
N. Jones
- 1373**—ARORA, U. S., BHADURI, N. V. & BASU, S. P., 1958. "Radiological lymphangiography in chronic lymphoedema of scrotum in filarial patients: further observations." *Bulletin of the Calcutta School of Tropical Medicine*, **6** (1), 8–9.
- 1374**—ASP, B. A. & SHUMARD, R. F., 1957. "The pinworm, *Enterobius vermicularis* (Linnaeus, 1758), in children of a North Dakota village." [Abstract of paper presented at the 49th Annual Meeting of the North Dakota Academy of Science.] *Proceedings of the North Dakota Academy of Science*, **11**, 54.

*1375—BELER, B. & SIPAHIOĞLU, H., 1958. "Gündüz kanda mikrofilariyalari tesbit edilen latent bir filariasis vak'asi münasebetiyle." [Case of filariasis with detection of microfilariae in blood during daytime.] *Türk Tıp Cemiyeti Mecmuası*, 24 (2), 117-125.

1376—BERGER, E. M. & JUGLAIR, Jr., J., 1957. "Oclusão intestinal aguda por áscaris em infantes. (Com apresentação de 2 casos)." *Medicina, Cirurgia, Farmácia*. Rio de Janeiro, No. 255, pp. 286-292.

1377—BEYE, H. K. & WRIGHT, W. H., 1959. [U.S. Department of Health, Education & Welfare, Public Health Service, National Institutes of Health, Bethesda 14, Maryland, U.S.A.] "The National Filaria Control Program (NFCP) of India: investigative challenges." *Bulletin of the National Society of India for Malaria and other Mosquito-Borne Diseases*, 7 (2), 45-52.

Beye & Wright outline a variety of research projects that might be undertaken by the National Filaria Control Programme of India in its efforts to control, and ultimately eradicate, infections due to *Wuchereria bancrofti* and *W. malayi*. J. W. Smith

1378—BIAGI F., F. & RODRIGUEZ, O., 1960. [Unidad de Patologia, Escuela de Medicina, U.N.A.M., Hospital General, México 7, D.F., Mexico.] "A study of ascariasis eradication by repeated mass treatment." *American Journal of Tropical Medicine and Hygiene*, 9 (3), 274-276.

Biagi & Rodriguez administered piperazine hexahydrate in a single dose of 100 mg. per kg. body-weight (not exceeding 4 gm. total) to each of 529 persons representing almost the whole population of a small Mexican village. Treatments were given simultaneously once a month to all individuals. 5% to 8% on each occasion missed taking the drug. There were no untoward side effects in 3,968 individual treatments given. After the first treatment 115 persons (28.3%) expelled *Ascaris*. Tables show that the number of persons who expelled worms and the number of worms eliminated diminished each month. With each successive treatment there was an increase in the proportion of immature worms amongst those passed. No mature worms were detectable after the sixth treatment. After the eighth treatment *Ascaris* was not detectable in any stool. The authors conclude that the eradication of human ascariasis by repeated mass treatments can be achieved, at least in a closed population. J. W. Smith

1379—BORODA, C., 1959. "An investigation into the incidence of onchocerciasis in a community exposed to infection." *East African Medical Journal*, 36 (11), 610-612.

298 Europeans and Asians who had been in Kilembe (Belgian Congo) for two years or more were examined for onchocerciasis. None showed any clinical or allergic signs. Nine who had an eosinophil rate of over 10% were children with intestinal helminths in whom, after treatment, the rate fell below 4%. One year later 125 of those originally examined were tested again; all were negative. The whole population was subject to bites from infected *Simulium* and though the incubation may be prolonged, it is suggested that in some cases some factor prevents the development of the disease. W. K. Dunscombe

1380—BRANCACCIO, G. & VINGIANI, A., 1958. [Clinica delle Malattie Infettive e delle Malattie Tropicali dell'Università di Napoli, Campania, Italy.] "Sulla diffusione delle parassitosi intestinali nei bambini del Comune di Agerola. Gravità del problema." *Acta Medica Italica di Malattie Infettive e Parassitarie*, 13 (9), 250-252.

In Agerola (Naples) faecal samples taken at random revealed an incidence of helminths in children aged one to two years of 40%, two to four years of 66.6%, four to six years of 86.5%, and six to 12 years of 100%. *Ascaris lumbricoides* had by far the highest incidence, but *Trichuris trichiura* and *Enterobius vermicularis* were also present in all except the one to two-year age group which was infected with *Ascaris* only. W. M. Fitzsimmons

1381—BRINKMAN, G. L. & KOOS, L., 1957. [Pulmonary Division, Henry Ford Hospital, Detroit, Michigan, U.S.A.] "ACTH and cortisone in trichinosis." *Journal of the Michigan State Medical Society*, 56 (7), 867-870.

1382—BROWNE, S. G., 1960. "Onchocercal depigmentation." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 54 (4), 325-334.

Onchocercal depigmentation occurs only in persons with long standing disease and is relatively benign. Length of sojourn in hyperendemic foci is the determining factor. The site most

affected is the pretibial skin and where depigmentation is present ocular lesions due to *Onchocerca volvulus* are likely. The condition which may be due to an anaphylactic reaction to a toxin from the adult worms or microfilariae is reversible in certain circumstances.

W. K. Dunscombe

1383—BUCCO, G., LANNA, P. & MAZZITELLI, L., 1957. [Clinica delle Malattie Infettive e delle Malattie Tropicali e Sub-Tropicali dell'Università di Napoli, Italy.] "Indagine sulla diffusione delle parassitosi intestinali nella provincia di Caserta. L'identificazione di un focolaio di anchilostomiasi a Bellona." *Riforma Medica*, **71** (41), 1156.

1384—BUMBALO, T. S. & STIFF, D. W., 1957. "The roentgenologic diagnosis of roundworm infection." *New York State Journal of Medicine*, **57** (23), 3832-3834.

1385—BURNETT, G. F., 1960. [Filariasis Research Unit, Fiji.] "Filariasis research in Fiji 1957-1959. Part I. Epidemiology." *Journal of Tropical Medicine and Hygiene*, **63** (7), 153-162.

Continuing the work of Symes (1960) [for abstracts see *Helm. Abs.*, **30**, Nos. 1037, 1038 and 1058] Burnett gives further data on filariasis in Fiji. No new vectors of the infection are incriminated besides those mentioned by Symes. From examinations of *Aedes pseudoscutellaris*, *A. polynesiensis*, *A. fijiensis* and *Culex fatigans* it was concluded that the first two species, taken together, are the principal vectors of human filariasis, and that the last two species are of secondary importance. The incidence of microfilarial infections detected among the people was about 6.4% to 15.4% and varied with the technique. The incidence of infection of mosquitoes was of the order of 4.1% to 11.4%. The mean daily mortality of the vectors was estimated to be 20% to 29%. 13 out of 25 dogs were infected with *Dirofilaria immitis*. Other filarial infections were present in seven out of 46 wild pigeons and in six out of 86 mynahs. Seven cats, 36 pigs and nine bulbuls were negative. After mass administration of diethylcarbamazine all filarial larvae, except *D. immitis* and very few *Wuchereria bancrofti* disappeared from mosquitoes. It is therefore concluded that this is a good indication that no confusion arose from unknown animal or bird filariae.

N. Jones

1386—CARNEIRO, J. F., 1957. [Faculdade de Medicina da Universidade de Pôrto Alegre, Brazil.] "Doença de Löfller recidivante e aneosinofílica em paciente com esrongiloidose e aplasia do setor eosinofílico." *Arquivos Brasileiros de Medicina*, **47** (1/2), 1-6. [English summary p. 6.]

***1387**—CARTER, W. C., 1957. "Trichinosis—an epidemiological report." *Public Health News, Trenton, N.J.*, **38** (6), 205-207.

1388—CASTELLANI, A., 1960. [Instituto de Medicina Tropical, Lisbon, Portugal.] "Elephantiasis nostra and elephantiasis tropica: a comparative study." *Journal of Tropical Medicine and Hygiene*, **63** (9), 216-221.

Castellani compares the symptomatology, aetiology, pathology and treatment of elephantiasis nostra and elephantiasis tropica, the former being a disease of the temperate zone and the latter generally believed to be due to *Wuchereria* infections. It is suggested that both elephantiasises are essentially the same. In elephantiasis nostra bacterial infection is always primary but in elephantiasis tropica it could be either (i) primary or (ii) secondary to filarial infection. Filarial infection acts as an irritating or traumatic agent provoking bacterial infection. This point is illustrated by cases of elephantiasis without filarial infection and by the failure of filaricidal drugs to cure attacks of lymphangitis and pachydermia. The author also quotes from his experience a case of elephantiasis with microfilariae, but where a streptococcus, similar or identical to *Streptococcus metamyces* Castellani, 1934, was also present in the inguinal glands. It is therefore suggested that *S. metamyces* vaccine might be tried in the treatment of tropical recurring lymphangitis and elephantiasis.

N. Jones

1389—CAVIER, R., JAMMET, M. L. & BISMUT, A., 1957. "Traitement de l'oxyurose par le cinnamate de n.butyle." *Presse Médicale*, **65** (5), 91.

The authors treated enterobiasis in two series of children with *n*-butyl cinnamate. The drug was given orally and in the form of suppositories at the same time. Details of dosage rates are given. The treatment was 70% to 80% successful and there were no side effects.

S. Willmott

1390—COTTELEER, C., GRÉGOIRE, C. & POUPLARD, L., 1960. "Syntheses de pathologie parasitaire. VII. La 'larva migrans' viscérale." *Annales de Médecine Vétérinaire*, **104** (4), 197-199.

***1391**—CRESPIN, J. & QUEIROZ, J., 1957. "Tratamento da ascariíase na infância pela piperazina hexaidratada; 50 casos." *Pediatria Prática. São Paulo*, **28** (1), 71-78.

1392—CZERNIK, A. & TATÓN, J., 1957. [Warszawa, ul. Nowogrodzka 59, Poland.] "Dynamika skurczu serca we włośnicy." [Dynamics of the heart systole in trichinellosis.] *Polskie Archiwum Medycyny Wewnętrznej*, **27** (6), 763-772. [English & Russian summaries pp. 771-772.]

1393—DASHIELL, G. F., 1961. [Metropolitan Hospital Clinics, Detroit, Michigan, U.S.A.] "A case of dirofilariasis involving the lung." *American Journal of Tropical Medicine and Hygiene*, **10** (1), 37-38.

Chest X-ray detected a lesion in the lung of a 57-year-old Detroit woman with cardiac symptoms. In the resected cyst-like lesion a dead filarial worm, possibly a female *Dirofilaria immitis*, was found in a necrotic pulmonary artery. Dashiell refers to Faust's paper on human infections with *Dirofilaria* [for abstract see Helm. Abs., **26**, No. 52c]. Photomicrographs show sections of the worm *in situ*.

J. W. Smith

1394—DAVIES, A. M., 1961. [Department of Preventive Medicine, Hebrew University, Jerusalem, Israel.] "Filariasis in Indian Jews in Israel. A five-year follow-up." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (1), 52-55.

Of those members of the Jewish communities of Cochin in south-west India who settled in Israel in 1953-55, 13.5% showed clinical signs of filariasis, as reported by Reitler & Yoffe in 1955 [for abstract see Helm. Abs., **24**, No. 320a], and in a second examination in 1955-56, 11.6% had microfilariae in the peripheral blood, as reported by Yoeli in 1956 [for abstract see Helm. Abs., **25**, No. 701a]. A microfilarial survey made in 1958 revealed only two lightly infected cases in over 1,000 individuals. No autochthonous cases were discovered although the indigenous *Culex pipiens molestus* had been shown in laboratory experiments to be a potential vector. The majority of the new settlers had been housed in new villages in hilly areas and received a course of hetrazan. One of the two infected individuals had not been treated. Details of the second case were unobtainable.

R. T. Leiper

***1395**—DESENNE, J. J., 1957. "Hookworm infection." *Medical Times. New York*, **85** (9), 1027-1037.

1396—DE SILVA, C. C., 1957. [University of Ceylon, Colombo, Ceylon.] "Tropical ascariasis." *Journal of Tropical Pediatrics. Calcutta*, **3** (2) 62-73.

De Silva reviews both his own and the work of others on the incidence, clinical syndromes and treatment of tropical ascariasis in children. Continued fever with hepatomegaly in ascariasis may be due to *Toxocara canis* infection since this syndrome is clinically akin to that seen in visceral larva migrans. A larva, presumably of *Ascaris lumbricoides*, has been recovered from the lung at autopsy in one case. Migration of larvae into unusual sites, e.g. into the liver and thoracic cavity, is discussed and illustrated by photomicrographs. The relationship between ascariasis and the syndrome of toxæmia with nervous symptoms is discussed. The author examines the results of treating ascariasis with various piperazine compounds.

J. W. Smith

1397—DEXTER, M. W., DEXTER, H. L. T. & LAWTON, A. H., 1960. [Veterans Administration Center, Bay Pines, Florida, U.S.A.] "A note on psychoses and Loeffler's syndrome complicating creeping eruption." *American Journal of Tropical Medicine and Hygiene*, 9 (3), 297-298.

Dexter *et al.* present three cases of male persons suffering from creeping eruption (due to nematode larvae) who developed both psychotic depressions and findings suggestive of Loeffler's syndrome. Treatment with ethyl chloride and/or carbon dioxide snow brought about an improvement in the condition of their skin lesions with an almost parallel improvement of their mental states. J. W. Smith

1398—FAUST, E. C. & GIRALDO, L. E., 1960. [Tulane University School of Medicine, New Orleans, Louisiana, U.S.A.] "Parasitological surveys in Cali, Departamento del Valle, Colombia. VI. Strongyloidiasis in Barrio Siloé, Cali, Colombia." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 54 (6), 556-563.

In this epidemiological study of the incidence of *Strongyloides stercoralis* in Barrio Siloé, an economically poor community about 1,000 m. above sea level in the western part of Colombia, 137 out of 982 members of 62 of the 92 families examined proved positive. 4.8% showed appreciable infection before reaching five years of age. The zinc sulphate centrifugal flotation technique was 50% more efficient than double cover-glass direct films for the detection of *Strongyloides* larvae in faeces. R. T. Leiper

1399—FERNÁNDEZ BOUZAS C., A. & TRUJILLO DUARTE, H., 1960. "Ensayo terapéutico con yoduro de ditiázanina en algunas parasitosis intestinales." *Medicina. Revista Mexicana*, 40 (855), 503-506.

Dithiazanine iodide (Netocyd) was given *per os* to 13 patients with *Ascaris lumbricoides*, 15 with *Enterobius vermicularis* and 14 with *Trichuris trichiura*. The daily doses ranged from 200 mg. to 1.5 gm. and were given for eight to 16 days. The efficacy of the treatment was 92.3% in ascariasis, 100% in enterobiasis and 92% in trichuriasis. The treatment was well tolerated by the patients. N. Jones

1400—FOY, H. & KONDI, A., 1961. [Wellcome Trust Research Laboratories, Nairobi, Kenya.] "Symposium on hookworm disease. III. The relation of hookworm loads and species to intestinal blood loss and the genesis of iron deficiency anaemia." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (1), 26-29. [Discussion pp. 30-35.]

As the predominant anaemia in the damp regions of the tropics is due to iron deficiency associated with hookworm infection, Foy & Kondi advise the fortification of one of the items of diet in common use, mass treatment to reduce worm load but not to obtain egg-negative faeces, improvement in sanitary habits, the provision of pit latrines and the general use of foot-wear which in primitive countries is usually a sign of social status. It is pointed out that severe symptoms such as malaise, nausea, vomiting and headache, accompanied by an eosinophilia up to 80%, may also be due to anaphylactic reactions to toxic substances produced by hookworms before anaemia develops. R. T. Leiper

*1401—FRANÇA, O. H., 1957. "Extrato ascaridiano e provas cutâneas." *Pediatria Prática. São Paulo*, 28 (9), 421-426.

1402—FRIEDMAN, S. & HERVADA, A. R., 1960. [Division of Cardiology, Children's Hospital of Philadelphia, U.S.A.] "Severe myocarditis with recovery in a child with visceral larva migrans." *Journal of Pediatrics*, 56 (1), 91-96.

A two-and-a-half year old female negro child was admitted twice to hospital for severe myocarditis with extensive cardiac enlargement. Eosinophilia was present on both occasions, more marked on the first; no laboratory evidence of any parasitic infection was found but the family pet dog was infected with *Toxocara canis* and the patient had a pica for earth. After treatment she improved; four years later she was quite healthy with a normal heart and had got over her pica. W. K. Dunscombe

*1403—FUA, C., 1957. "Note epidemiologiche sull'anchilostomiasi nell'Anconitano." *Minerva Medica*, 48 (51), 2247-2249.

- 1404—FUKAMACHI, H., 1960. [Clinical Department, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] [Experimental studies on the periodicity of microfilariae. II. Influence of prolonged chlorpromazine treatment on the microfilarial periodicity.] **Endemic Diseases Bulletin of Nagasaki University**, 2 (1), 39–45. [In Japanese: English summary p. 45.]
Two dogs infected with *Dirofilaria immitis* and seven carriers of *Wuchereria bancrofti* were treated with chlorpromazine for 11 to 21 days, at the rates of 150 mg. to 200 mg. in dogs and 37.5 mg. to 200 mg. in patients, three times a day. A prolonged treatment with the drug caused very significant changes in the microfilarial periodicity, which suggested that the disorder or the reversal of the nocturnal periodicity were connected with a physiological response of the host to sympathomimetic drugs. Y. Yamao
- 1405—GALLIARD, H., 1957. "Larva migrans viscérale." **Presse Médicale**, 65 (39), 916–918.
- 1406—GERBAUX, A., GARIN, J. P. & LENÈGRE, J., 1957. "Cardiopathie et filariose." **Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris**, 4e série, 73 (25/26), 873–887. [Discussion p. 887.]
- 1407—ICHIOKA, S. ET AL., 1960. [Department of Internal Medicine, Osaka Medical College, Takatsuki, Osaka, Japan.] [A statistical study on the present trend of hookworm disease and its treatment in Japan.] **Japanese Journal of Parasitology**, 9 (6), 646–653. [In Japanese: English summary p. 653.]
Ichioka *et al.* state that the incidence of ancylostomiasis is decreasing in Japan but in rural communities it is still high. Of the 12 anthelmintics in use in Japan for ancylostomiasis tetrachlorethylene and 1-bromo-naphthol (2) are the most usual. These chemicals are not free from side effects but 1-bromo-naphthol (2) produced less than did the others. Y. Yamao
- 1408—ISHIZAKI, T. ET AL., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [Clinical studies on the hookworm carriers. 6. Analysis of the outbreaking mechanism of hookworm anaemia through the reticulocyte count in blood, quantitative determination of iron content in serum and faeces, blood loss in faeces and the X-ray examination of small intestine.] **Japanese Journal of Parasitology**, 9 (5), 500–509. [In Japanese: English summary p. 509.]
- 1409—IYENGAR, M. O. T., 1957. "Annotated bibliography of filariasis and elephantiasis. Part 3. Symptomatology, aetiology, pathology and diagnosis of filariasis due to *Wuchereria bancrofti* and *W. malayi*." **Nouméa, New Caledonia: South Pacific Commission**, Technical Paper No. 109, xvi+276 pp.
- 1410—JALAYER, 1960. "*Rhabditis axei* as a human parasite." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (4), 289–290.
- 1411—JELLIFFE, D. B. & JUNG, R. C., 1957. "Ascariasis in children." **West Indian Medical Journal**, 6 (12), 113–122.
- 1412—KOLÁŘ, J., SCHÖN, E. & VOŠTA, J., 1957. "Naše zkušenosti s piperazinem při léčbě askaridózy." [Piperazine in the treatment of ascariasis.] **Československá Pediatrie**, 12 (10), 917–920.
- 1413—KOMIYA, Y., ISHIZAKI, T., KUTSUMI, H. & KUMADA, M., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [The anthelmintic effect of bephenium hydroxynaphthoate on *Necator americanus*.] **Japanese Journal of Parasitology**, 9 (6), 706–710. [In Japanese: English summary p. 701.]
5 gm. per adult of bephenium hydroxynaphthoate (Alcopar) was given to 45 hookworm carriers. Most *Necator americanus* (84%) and all *Ancylostoma duodenale* were expelled less than 24 hours after the treatment. The reduction rate was 48.3% three weeks later. Ten cases out of 45 had side effects such as headache, dizziness and intoxication; 22 cases had abdominal pains, borborygmus, vomiting and diarrhoea. These symptoms were mild, fatigue being rarely observed compared with cases treated with other anthelmintics. Y. Yamao

- 1414—KOMIYA, Y., KOBAYASHI, A., OGAWA, H. & KUMADA, M., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [Mass treatment of oxyuriasis with pyrrvinium pamoate (Poquil).] **Japanese Journal of Parasitology**, 9 (5), 551–555. [In Japanese: English summary p. 555.]
 Pyrrvinium pamoate (Poquil) was given to patients harbouring *Enterobius* in a single dose of 5 mg. per kg. body-weight. Negative swabs for seven consecutive days two weeks after the treatment were chosen as a criterion of cure. The cure rates obtained with pyrrvinium pamoate were 46 out of 49 in capsule form, and 31 out of 35 in syrup form. The medicine both in capsule and syrup was well accepted and tolerated, and no side effects were encountered in most of the patients (117 out of 125), except for a few children (8 out of 125) who complained of slight symptoms such as nausea, headache, vomiting or stomach-ache. Y. Yamao
- 1415—KUTSUMI, H., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [Studies on iron clearance in hookworm carriers. 1. Determination and distribution of iron in faeces.] **Japanese Journal of Parasitology**, 9 (6), 654–661. [In Japanese: English summary p. 661.]
- 1416—MCGILL, D. A., 1957. "A minor outbreak of trichinosis in the London area." **Guy's Hospital Reports**, London, 106 (2), 92–100.
 Three cases of trichinelliasis were seen in south-east London in May 1955. Two were housewives who had bought pork sausages from a small local butcher's shop on the same day and both developed generalized infection nine days later. In the third case, the husband of one of the cases, symptoms developed on the 15th day. A fourth, apparently unrelated, case was detected at post-mortem following a motor car accident; the victim had been accustomed to eating pork obtained from a branch of the Lewisham shop patronized by the three patients already mentioned. R. T. Leiper
- 1417—MCGOWAN, T. F., 1959. "Public health engineering aspects in filaria control in India." **Bulletin of the National Society of India for Malaria and other Mosquito-Borne Diseases**, 7 (1), 3–14.
 McGowan discusses the need for close liaison between mosquito control officers and public health engineers in India before any new drainage or sewage system is installed; in this way better control of the mosquito vectors of filariasis may be effected. J. W. Smith
- 1418—MCGREGOR, I. A. & GILLES, H. M., 1960. [Medical Research Council Laboratories, Fajara, Gambia.] "Further studies on the control of bancroftian filariasis in West Africa by means of diethylcarbamazine." **Annals of Tropical Medicine and Parasitology**, 54 (4), 415–418.
 Although diethylcarbamazine was highly effective against *Wuchereria bancrofti* the incidence of minor toxic symptoms made its use highly unpopular in field control. With a reduced dosage of 2.5 mg. per kg. body-weight on five successive days the circulating microfilariae had disappeared three months later in nine of 47 persons treated; by the 43rd month only six of 54 individuals treated showed circulating microfilariae. This subsequent reduction is probably attributable to the natural death of the surviving microfilariae which were not replaced owing to the lethal effect of the drug on the parent worms. It is suggested that the most effective and economical method of dealing with the infection is by mass treatment campaigns renewed at intervals of, say, two to four years. R. T. Leiper
- 1419—MARSDEN, A. T. H., 1960. [Division of Pathology, Institute for Medical Research, Kuala Lumpur, Federation of Malaya.] "Report of a nematode worm, probably *Enterobius vermicularis*, in the prostate." **Medical Journal of Malaya**, 14 (3), 187–190.
- 1420—MATHUR, P. S., 1957. [Gandhi Medical College, Bhopal, Madhya Pradesh, India.] "Social factors in the aetiology of ascariasis in children in Bhopal." **Agra University Journal of Research. Science Section**, 6 (1), 91–95.
 8% of 7,500 children attending the Pediatrics Department of the Hamida Hospital in Bhopal had ascariasis. 495 of the 550, whose social and economic conditions could be traced, belonged to families of the very low or low earning group, living in overcrowded and dirty conditions principally in the town centre. G. I. Pozniak

- 1421—MILLS, A. R., 1960. [Social Sciences Research Centre, 39, George Square, Edinburgh 8, Scotland.] "Filariasis in the New Hebrides." [Correspondence.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (6), 597.

Mills reports that during bush tours with Lemaigre in the New Hebrides in 1952-57, 35 cases of elephantiasis of the leg were seen among the 6,800 New Hebrideans examined. The cases occurred in the northern and central parts of the group of islands as Buxton had observed in 1927.

R. T. Leiper

- 1422—MOLINA PASQUEL, C. & DÍAZ MUÑOZ, A., 1959. [Instituto de Salubridad y Enfermedades Tropicales, Mexico.] "Efectividad del tetracloretileno emulsionado en el tratamiento de la uncinariasis." **Revista del Instituto de Salubridad y Enfermedades Tropicales, Mexico**, 19 (1), 11-14. [English summary p. 13.]

Out of 36 patients treated with a single dose of 0.12 ml. tetrachlorethylene per kg. body-weight emulsified in water and Tween 80, ancylostome ova (mostly *Necator americanus*) disappeared in 25. The remainder required two or more treatments. No side effects were noted and it is considered that the addition of an emulsifier enhanced the drug's activity. W. K. Dunscombe

- 1423—NAGATOMO, I., 1960. [Department of Medical Zoology, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] "Epidemiology and control of bancroftian filariasis in some villages of Nagasaki Prefecture. I. Incidence of filariasis and natural infection rate of mosquitoes in Nanatugama and Taira villages." **Endemic Diseases Bulletin of Nagasaki University**, 2 (4), 296-306.

The results of blood film and mosquito surveys in the villages of Nanatugama and Taira in Nagasaki Prefecture are set out in detail in six tables. The average microfilarial count per infected person was 15.8 and 16.8 in these two villages. In Nanatugama 12 out of 37 mosquitoes captured within mosquito nets, eight out of 38 captured within houses and none of those taken out of doors showed infection. That the dissections of mosquitoes taken in Taira were entirely negative is attributed to the absence of human carriers in the houses visited. The principal vector was *Culex pipiens pallens*, 20 out of 81 specimens dissected being infected. This species was very abundant in the houses, was very fond of human blood and was definitely a house-abiding mosquito, frequently invading mosquito nets, and had a very short flight range.

R. T. Leiper

- 1424—NAGATOMO, I., 1961. [Department of Medical Zoology, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] "Epidemiology and control of bancroftian filariasis in some villages of Nagasaki Prefecture. 3. Epidemiology and mass treatment of filariasis in Amakubo village." **Endemic Diseases Bulletin of Nagasaki University**, 3 (1), 75-85.

A filaria control experiment with hetrazan was carried out in a farming village with about 630 people. Three blood examinations were made at intervals of four-and-a-half-months before the administration of the drug began. The dosage schedule adopted was 2 mg. per kg. body-weight thrice daily for ten consecutive days. Out of 100 positives only 45 became negative after one course. After a second course 46 positives became negative and after three to five courses nine became almost negative. It was noted that the more heavily infected were less easily curable. The large dosage caused severe reactions, while the very slightly infected and those in the incubation period raised further problems. Statistical details occupy 15 tables.

R. T. Leiper

- 1425—NAIR, C. P., ROY, R. G. & RAGHAVAN, N. G. S., 1959. [Malaria Institute of India, Delhi, India.] "Blood groups and filariasis." **Bulletin of the National Society of India for Malaria and other Mosquito-Borne Diseases**, 7 (4), 119-121.

Nair *et al.* have classified the blood of 981 persons with established filarial disease (due to either *Wuchereria bancrofti* or *W. malayi* and negative for microfilariae) and of 149 uninfected persons from the same area of Ernakulum, Kerala State, into either group A, B, AB or O. The frequency distribution of each blood group among the infected persons showed no statistically significant difference from that among the uninfected persons. These findings are in disagreement with those of Franks who, the authors state, postulated that persons with the blood group A, were more susceptible (to filarial disease) than the rest [see **Proc. Soc. exp. Biol., N.Y.**, 1946, 62, 17-18].

J. W. Smith

- 1426—NIVALDO, J., 1957. "Tratamento marcial exclusivo e associado na anemia ancilostomótica." *Revista Brasileira de Medicina*, **14** (6), 388–391. [English summary p. 391.]
- *1427—OLIVIER, A., 1957. "Les aspects radiologiques des hémato-lymphochyluries filariennes." *Journal de Radiologie et d'Électrologie*, **38** (3/4), 286–288.
- 1428—ONORI, E., 1958. [Medical Officer, I/C North-East Unit, Medical Field Units, Chana, Italy.] "Sulla terapia attuale dell'oncocercosi." *Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia*, **39** (9), 575–592. [English, French & German summaries pp. 589–590.]
Onori reviews recent literature on the treatment of onchocerciasis and tabulates the results published by individual authors. After discussing the advantages and disadvantages of suramin and diethylcarbamazine he concludes that in spite of the promising results which can be obtained by chemotherapy it is only possible to eradicate onchocerciasis by eliminating R. T. Leiper
- 1429—ORLOV, I. V. & PLOTNIKOV, N. N., 1958. [Control of trichinelliasis.] *Vestnik Selskokhozyaistvennoi Nauki*, **3** (2), 73–79. [In Russian: English & German summaries p. 79.]
- 1430—OSNES, M., 1957. [Medisinsk avdeling, Akershus fylkessykehus, Midstuen, Oslo.] "Loiasis. Noen tilfelle behandlet med diethylcarbamazine." *Nordisk Medicin*, **58** (36), 1317–1319. [English summary p. 1319.]
- 1431—OVNATANYAN, K. T., 1958. [Ascarid infections of the urogenital organs.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 253–256. [In Russian.]
- 1432—OYE, E. VAN, 1961. [L'Institut de Médecine Tropicale "Princess Astrid", Léopoldville, Congo.] "Symposium on hookworm disease. I. The problem of ancylostomiasis in the Congo and Ruanda-Urundi." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (1), 17–19. [Discussion pp. 30–35.]
Ancylostomiasis in the Congo and Ruanda-Urundi presents one of the greatest hazards to the health of the inhabitants. In a total population of 12 million nearly 500,000 cases are recorded annually. Bephenium hydroxynaphthoate has qualities which make it suitable for use in mass treatment but as mild intestinal intolerance has been seen in rare instances in Leopoldville when children have taken a good deal of palm oil on the evening before treatment, it is suggested that the influence of a diet rich in fat on tolerance to bephenium requires investigation. R. T. Leiper
- 1433—OZERETSKOVSKAYA, N. N., 1958. [Klinicheski sektor, Institut malyarii, meditsinskoi parazitologii i gelmintologii, Ministerstvo zdoravookhraneniya SSSR.] [Pathogenesis of the pain syndrome in trichinelliasis.] *Sovetskaya Meditsina*, **22** (6), 90–95. [In Russian.]
- 1434—PETER, H., 1957. "Über Wurmgranulome des Bauchfells." *Zentralblatt für Gynäkologie*, **79** (41), 1616–1621.
- *1435—PICHARDO SARDÁ, M. E., PADOVANI, P. & SANTANA, Z., 1957. "Tratamiento antihelmintico de 37 casos de uncinariasis con tetracloroetileno U.S.P. emulsionado en agua con polioxi-etileno de sorbitán sin purgante (coctel de tetrachloroetileno)." *Revista Médica Dominicana*, **11** (3), 27–35.
- 1436—POWELL, S. J., HENNESSY, E., WILMOT, A. J. & ELSDON-DEW, R., 1961. [Department of Medicine, University of Natal, Amoebiasis Research Unit, Durban, South Africa.] "The incidence of intestinal parasites in amebic and bacillary dysentery." *American Journal of Tropical Medicine and Hygiene*, **10** (1), 22–24.
Powell *et al.* used 100 African males with proved amoebic dysentery (due to *Entamoeba histolytica*), 50 males with proved bacillary dysentery, and a control group of 100 males with non-dysenteric infections. Heavy loads of helminth infection in each group were rare, with the highest incidence of *Trichuris* and *Ascaris* in those with amoebic dysentery. Treatment of

the dysenteric groups with a combination of tetracycline, di-iodo-hydroxyquinoline and chloroquine brought about a reduction of *Ascaris* incidence. There is a possibility that the high incidence of *Trichuris* may predispose to invasion by *E. histolytica*, although the association between the amoebae and *Trichuris* and *Ascaris* may be due to the common epidemiological factors of poor hygiene and sanitation.

J. W. Smith

1437—RAHMAN, J., SINGH, M. V. & SHARMA, K. L., 1959. "Pre-control survey in the Filaria Control Unit, Barabanki, U.P." **Bulletin of the National Society of India for Malaria and other Mosquito-Borne Diseases**, 7 (4), 107-117.

Rahman *et al.* examined 4,957 persons of various ages from Nawabganj Tehsil and found 10% infected with the microfilariae of *Wuchereria bancrofti* and 3.1% with physical manifestations of the disease; only two persons had both microfilariae and manifestations of the disease giving an endemicity rate of 13.06%. Of over 10,000 *Culex fatigans* examined 81% were found infected with microfilariae, this being the only species of nine examined found infected; the vector was found breeding in tanks, drains, cesspools, "nalas" and ponds. In the comparison area of the Zaidpur Town Area 5,547 persons were examined and 10.6% were infected with microfilariae and 4.09% showed physical manifestations of the disease with an endemicity rate of 14.32%; *C. fatigans* was again the only vector.

J. W. Smith

1438—RAHMAN, J., SINGH, M. V. & SHRIVASTAVA, R. N., 1959. "Filariasis in Bahraich town (Uttar Pradesh)." **Bulletin of the National Society of India for Malaria and other Mosquito-Borne Diseases**, 7 (2), 53-63.

Rahman *et al.* examined 4,151 persons of various ages representing 9.2% of the total population of Bahraich town, Uttar Pradesh, and found 6.39% infected with the microfilariae of *Wuchereria bancrofti* and 7.6% with physical manifestations of the disease, chiefly hydrocele and elephantiasis of the lower limbs; only 11 persons had both microfilariae and manifestations of the disease giving an endemicity rate of 13.39%. The authors state that about 50 to 60 years ago filariasis was not known in this area but that in the last 15 years a sudden upward trend in the incidence of the disease has been noticed. The vector, *Culex fatigans*, was found breeding in stagnant drains and pools and in cesspools; 0.9% of 2,200 *C. fatigans* were found infected with microfilariae.

J. W. Smith

***1439**—REYES ORIBE, H. & LEJTMAN, A., 1958. "Hallazgo en Catamarca de *Wuchereria bancrofti*." **Día Médico. Buenos Aires**, 30 (20), 660.

1440—RIEGEL, K., 1957. [Universitäts-Hautklinik, Tübingen, Germany.] "Über krankhafte Hauterscheinungen bei Trichuriasis." **Zeitschrift für Haut- und Geschlechts-Krankheiten**, 23 (12), 337-345.

Riegel quotes six cases from the Tübingen Clinic for Skin Diseases in which *Trichuris* infections were associated with cutaneous symptoms. One of these, an eleven-year-old boy in whom *Trichuris* eggs were confirmed in a third faecal test, showed unusual cutaneous symptoms in the form of *papulesis miliaris* of the body, scalp and upper extremities.

G. I. Pozniak

1441—RODGER, F. C., 1957. "Acute ocular onchocerciasis and its treatment." **British Journal of Ophthalmology**, 41 (9), 544-557.

***1442**—RUIZ REYES, F., 1957. "Estado actual de las lesiones oculares oncocercosas." **Medicina. Revista Mexicana**, 37 (786), 573-579.

1443—SASA, M., SHIRASAKA, R., UOTANI, K. & MIURA, A., 1960. [Department of Parasitology, Institute for Infectious Diseases, University of Tokyo, Tokyo, Japan.] [A survey of hookworms and *Trichostrongylus* infections at a farming village in Akita Prefecture.] **Japanese Journal of Parasitology**, 9 (6), 685-691. [In Japanese: English summary p. 691.]

- 1444—SHEKHTMAN, E. M., 1958. [Kafedra akusherstva i ginekologii, Leningradski sanitarno-gigienicheski meditsinski institut, U.S.S.R.] [Helminthiasis in pregnancy and their treatment.] *Sovetskaya Meditsina*, 22 (3), 79–83. [In Russian.]

Out of 1,500 women, who had been pregnant for 6 to 40 weeks, 42.5% had helminthiasis, of which ascariasis (in 32.4%) and trichuriasis (in 8.8%) were the most frequent. The incidence of helminthiasis was more frequent among the 750 women with complicated pregnancy than in those in whom it was normal. Since administration of therapeutic doses of hexylresorcinol and of heptylresorcinol to white rats, at different stages of pregnancy, showed no ill effect, this treatment was used in worming the pregnant women. Heptylresorcinol completely cured 94.8% out of 101 cases of ascariasis. Administration of either of the drugs to the other women resulted in a visible improvement of the general condition and caused no ill effect. The threat of premature births was eliminated and 98 children observed for one to three years showed normal development.

N. Jones

- 1445—STEGAWSKI, T., 1957. [Warszawa, ul. Mickiewicza 18a, Poland.] “Włośnicze owrzodzenia narządu pokarmowego.” [Trichinous ulcerations of alimentary canal.] *Polskie Archiwum Medycyny Wewnętrznej*, 27 (1), 107–112. [English & Russian summaries p. 111.]

- 1446—STOTT, G., 1961. [Department of Clinical Tropical Medicine, London School of Hygiene and Tropical Medicine, London, W.C.1., England.] “Symposium on hookworm disease. II. Hookworm infection and anaemia in Mauritius.” *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (1), 20–25. [Discussion pp. 30–35.]

Hookworm infection and hypochromic microcytic anaemia are extremely common and are equally distributed in Mauritius where the diet is low in iron. It is therefore recommended that the national diet should be enriched with iron, initially at 10 mg. per person daily. This appears to be the most effective single public health measure against anaemia without anthelmintic treatment, which is apparently unsuitable owing to the insanitary conditions on the island.

R. T. Leiper

- 1447—TURCHINS, M. E., 1958. [Treatment of enterobiasis with piperazine sulphate.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 369–370. [In Russian.]

- 1448—ULEWICZ, K. & WYSOCKA, F., 1957. [Laboratorium San. Hig. Woj., Gdynia, Poland.] “Badania nad biocenozą flory i fauny jelitowej u dzieci w wieku przedszkolnym.” *Przegląd Epidemiologiczny*, 11 (3), 287–295. [English & Russian summaries pp. 293–294.]

Parasitological examinations of 246 children from crèches and kindergartens as well as 60 adult attendants showed the following incidence of helminthiasis among children and adults respectively: *Ascaris lumbricoides* 0.8% and 1.6%; *Trichuris trichiura* 8.5% and 6.6%; *Enterobius vermicularis* 11% and 3.3%. No helminths were found in children under one year old.

N. Jones

- 1449—UMIŃSKI, J., TOS-LUTY, S. & STROGIŃSKA, M., 1960. [Outline of some investigations in the field of rural parasitology.] *Meditsinskaya Parazitologiya i Parazitarnie Bolezni*. Moscow, 29 (5), 532–537. [In Russian.]

- 1450—WEBB, J. K. G., JOB, C. K. & GAULT, E. W., 1960. [Christian Medical College, Vellore, South India.] “Tropical eosinophilia. Demonstration of microfilariae in lung, liver, and lymph-nodes.” *Lancet*, Year 1960, 1 (7129), 835–842.

Webb *et al.* report the finding of microfilariae in lungs, liver and lymph nodes of patients who had been diagnosed as suffering from tropical eosinophilia, and describe the pathology of the changes in these tissues. Details are given of ten cases, eight of whom were children of up to 11 years old. Lung cases: Lung tissue, obtained by biopsy or after surgical operation on four different patients, was examined. “The lung tissue, before fixation, felt soft and spongy, but nodules were readily palpable. The cut surface showed irregularly scattered whitish nodules 3–5 mm. in diameter, the distance between the nodules varying from 1 to 3 cm.” Microscopic examination of the nodules showed infiltration of the alveolar walls by eosinophils; some were formed by areas of consolidation involving 20 to 30 alveoli distended with eosinophils.

"In the centre of some of these nodules, alveolar walls were destroyed with the formation of an eosinophil abscess and in the centre of some of these abscesses portions of microfilariae were found." Five almost complete microfilariae were found in sections of material from three different cases and fragments were found in 17 different nodules. Liver cases: In one case at laparotomy the liver was slightly enlarged and showed 20 to 30 whitish spots on the surface, of 1 mm. to 3 mm. diameter; in another it was considerably enlarged and was densely studded with white spots of 2 mm. diameter. (They were also present, on biopsy, in the liver of five other children with typical tropical (pulmonary) eosinophilia.) "The structure of these nodules was essentially similar to that of those seen in the lungs, varying from lakes of eosinophils to mature granulomata containing giant and epithelioid cells." In some 3,000 sections examined, one almost complete microfilaria was found in the centre of an aggregate of eosinophils (case 5)." Lymph node cases: Four children with tropical eosinophilia showed enlargement of lymph nodes in (i) axilla, (ii) axilla, (iii) axilla and inguinal region and (iv) generalized. Lymph node biopsy was performed in each case. They were soft and fleshy and the cut surfaces showed scattered brownish or greyish-white areas 1 mm. in diameter. Microscopically they were all the same. "The most striking abnormality was in the medullary cords and lymph sinuses, where there were numerous large aggregates of eosinophils." These varied in size and some of them contained portions of microfilariae in the centre. Nodes were teased out in saline and the centrifuged deposits examined; live microfilariae were found thus in cases 7, 8 and 10. "In stained films the microfilariae were sheathed, measured about 300μ in length and in each case showed the anatomical features characteristic of *Wuchereria bancrofti*." A long discussion follows in which the authors state the case for a filarial infection as a cause of tropical eosinophilia. "It now seems clear that tropical eosinophilia in all its possible clinical manifestations is usually due to infection with some form of filaria." In view of their findings they urge the enlargement of the concept of this disease to include the non-pulmonary forms of it and to use the terms pulmonary, hepatic and lymphatic when necessary. Moreover, a diagnosis of tropical eosinophilia should, in their opinion, be reserved for those cases where a filarial infection is suspected or proved, which would exclude similar syndromes due to other kinds of parasites, e.g. *Toxocara canis*.
J. J. C. Buckley

- 1451—WOODRUFF, A. W., ASHTON, N. & STOTT, G. J., 1961. [London School of Hygiene and Tropical Medicine, Department of Parasitology, London, W.C.1., U.K.] "*Toxocara canis* infection of the eye." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 55 (1), 13-14.

Miscellaneous

- 1452—ALMICI, C. & BONETTI, F., 1958. [Istituto d'Igiene della Università di Milano, Lombardy, Italy.] "L'ossigeno nel trattamento delle elmintiasi." **Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia**, 39 (10), 627-632. [English & French summaries p. 632.]

When treated by oxygen introduced into the duodenum by Kravetz's technique ten of 13 cases of *Taenia saginata*, seven with *Ascaris lumbricoides* and two with *Strongyloides stercoralis* were completely cured while in two cases of double infection with *T. saginata* and *Trichuris trichiura* and one with *Enterobius vermicularis* the results were negative. The faeces of the patients were systematically examined for about three months after the administration of the oxygen.
R. T. Leiper

- 1453—ALURRALDE, Jr., P., 1957. "Actualización terapéutica de la teniasis por *Taenia saginata*, oxiuriasis y ascariidiasis." **Prensa Médica Argentina**, 44 (3), 179-181.

- 1454—BAHDURI, N. V. & ARORA, U. S., 1958. "Parasitological survey of an Indian industrial population. Part II. Incidence of intestinal helminthic infections." **Bulletin of the Calcutta School of Tropical Medicine**, 6 (1), 6.

- 1455—BIGUET, J. & CAPRON, A., 1957. "La thérapeutique des parasitoses intestinales communes en France." **Semaine des Hôpitaux de Paris**, 33 (4), 241-243.

- *1456—BOGRÁN, N., 1957. "Tratamiento de los parásitos intestinales más frecuentes en Honduras." *Revista Médica Hondureña*, 25 (3), 90-93.
- *1457—CIMENTI, R., 1957. "Frequenza delle elmintiasi tra la popolazione infantile del Brefotrofio di Udine e risultati comparativi tra metodo di arricchimento di Ritchie e metodo di Willis." *Rivista Italiana d'Igiene*, 17, Suppl. pp. 172-180.
- *1458—COSTA, F. J., 1958. "Estudo sobre infestação helmintica na quinta zona aérea." *Revista Médica da Aeronáutica. Rio de Janeiro*, 10 (1/2), 115-117.
- *1459—FIGUEIRA, F. & COUTINHO, J. O., 1957. "Orientação para o emprêgo do C²Cl⁴ nas helmintoses intestinais e sua aplicação no tratamento da ascaridose." *Pediatria Prática. São Paulo*, 28 (3), 201-210.
- 1460—FIGUEIREDO, J. M. P. DE, 1958. [Director of the Medical College, Goa, India.] "Contribution to the study of intestinal parasitosis in Goa. Some clinical and laboratorial data." *Arquivos da Escola Médico-Cirúrgica de Goa. Série A*, No. 31, pp. 38-46.
- 1461—HUANG, W. H., CHIU, J. K. & KAO, C. T., 1957. [Department of Parasitology, College of Medicine, National Taiwan University, Taiwan.] [The incidence of intestinal parasites among the elementary school children in Taitung Prefecture, Taiwan.] *Journal of the Formosan Medical Association*, 56 (6), 264-284. [In Chinese: English summary pp. 283-284.]
- 1462—IWAŃCZUK, I. & STOBNIKA, I., 1957. [Zakład Parazytologii Lekarskiej PZH, Warszawa, Poland.] "Spostrzeżenia dotyczące zarażenia pasożytami jelitowymi u dzieci leczonych w Głównej Poradni Zdrowia Psychicznego." [Intestinal parasites in children at the Central Mental Health Dispensary.] *Pediatrics Polska*, 32 (2), 131-141. [English & Russian summaries pp. 140-141.]
- *1463—KEUSSÉOGLU, A., 1957. "La dilatation pupillaire. Signe nouveau de diagnostic dans les parasitoses digestives." *Revista Brasileira de Gastroenterologia*, 9 (3), 99-100.
- 1464—KHODAKOVA, B. I. & MAMEDOV, M. M., 1960. [Gelmintologicheskii otdel, Institut meditsinskoi parazitologii i tropicheskoi meditsini imeni E. I. Martynovskogo, Ministerstvo zdravookhraneniya SSSR.] [Helminth infections in the population of the Olkhon district of the Irkutsk region.] *Meditsinskaya Parazitologiya i Parazitarnie Bolezni. Moscow*, 29 (5), 609-610. [In Russian.]
- *1465—LAVIER, G., 1957. "Les éosinophilies parasitaires." *Sang. Paris*, 28 (5), 468-479.
- 1466—LIPPI, M., SEBASTIANI, A. & D'ERCOLE, G., 1958. [Clinica delle Malattie Tropicali e Subtropicali dell'Università di Roma, Centro Italiano di Gastro-Enterologia, Roma, Italy.] "Gli indici aspecifici di attività di malattia nelle parassitosi intestinali. I. Quadro sieroproteico." *Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia*, 39 (3), 155-166. [English, French & German summaries pp. 163-164.]
- The serum protein picture obtained by paper electrophoresis showed an increase in the alpha₂ or gamma globulins in some but not all individuals with *Ascaris*, *Enterobius* and *Taenia* infections but in those with ancylostomiasis there was a steady and definite dysproteidaemia with hypoalbuminaemia, hyper-alpha and hyper-gamma globulinaemia. R. T. Leiper
- *1467—MERCADO, R. & BIAGI, F., 1957. "Indices coproparasitoscópicos en el municipio de San Juan del Rio; Querétaro (México)." *Medicina. Revista Mexicana*, 37 (774), 268-269.
- 1468—MISHALANY, H. G. & GILBERT, D. R., 1957. [Memorial Hospital, Charleston, W. Va., U.S.A.] "Benign ossified lesion of the kidney. Report of a case resembling a hydatid cyst." *Journal of Urology*, 78 (4), 330-336.
- 1469—ONABAMIRO, S. D., 1957. "Intestinal poly-parasitism among Nigerian school children." *West African Journal of Biological Chemistry*, 1 (3), 71-87.

1470—PAULO FILHO, A., 1957. "Conjuntivite flictenular, alergia e verminose." *Revista Brasileira de Medicina*, **14** (11), 828–829.

Phlyctenular conjunctivitis in man may occur as an allergic response to endogenous toxins and to proteins such as, for example, toxins elaborated by most intestinal helminths and tuberculo-protein. The need for accurate differential diagnosis of the cause of this condition is pointed out.
W. M. Fitzsimmons

1471—PUCKETT, D. E., 1957. [Howard University College of Medicine, U.S.A.] "Parasitic infestation in Liberia." *Journal of the National Medical Association*. New York, **49** (5), 315–317.

1472—ROBLEDO, E., GONZÁLEZ, C. & BIAGI F., F., 1960. [Sección de Parasitología, Unidad de Patología, Escuela de Medicina, A.N.A.M., Hospital General, México 7, D.F., Mexico.] "Frecuencia de parasitosis intestinales en Xochimilco, D.F. (México)." *Medicina. Revista Mexicana*, **40** (850), 385–388.

1473—SIDOROVA, L., 1958. [The species composition and distribution of helminths in the population in northern areas of Kirgiz S.S.R.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 337–339. [In Russian.]

1474—WEBB, A. H., 1957. [Howard University College of Medicine, U.S.A.] "Intestinal parasitism in Beghemdir Province, Ethiopia." *Journal of the National Medical Association*. New York, **49** (5), 310–314.

1475—ŻELIGOWSKA-SZULC, J., 1957. "Obraz chorobowy i wyniki leczenia robaczyc na podstawie obserwacji Poradni Helmintologicznej." [Clinical picture and result of treatment of helminthiasis based on observations by the Helminthological Dispensary.] *Pediatrica Polska*, **32** (2), 113–130. [English & Russian summaries pp. 128–129.]

1476—ZEMBRZUSKI, K., 1957. [Zakład Higieny Szkolnej, Państwowy Zakład Higieny, Warsaw, Poland.] "Badania masowe parazytofauny przewodu pokarmowego człowieka w Polsce (rok 1954)." *Przegląd Epidemiologiczny*, **11** (3), 297–306. [English & Russian summaries p. 306.]

Faecal examinations of 30,076 persons from several provinces of Poland showed the presence of *Taenia solium*, *Taenia saginata*, *Hymenolepis nana*, *Ascaris lumbricoides* and *Enterobius vermicularis*. Greater incidence of helminthiasis was observed in the rural districts among the age group 14 to 18 years, whereas in towns it was greater in the age group 7 to 14 years.
N. Jones

VETERINARY HELMINTHOLOGY

Horses, Donkeys and Mules

1477—BUCHWALDER, R., 1960. [Berlin N4, Hannoversche Strasse 27/29, Germany.] "Zum koprologischen Nachweis einer *Strongyloides*-Infektion." *Monatshefte für Veterinärmedizin*, **15** (5), 149–150.

The author stresses the unreliability of single faecal examinations in the diagnosis of helminth infections, in particular with regard to *Strongyloides* spp. A two-month-old foal with a heavy *Strongyloides* infection was apathetic, very emaciated and retarded in growth. It was kept under observation between August 12th and October 7th and treated with gentian violet. Rectal collection of faeces was not possible, but daily faecal examinations by egg flotation and by larval concentration techniques were carried out on fresh early morning faeces collected from the stable. A histogram showed very considerable day to day variation in the proportion of larvae to eggs. An over-all diminution of numbers of both larvae and ova during the period of observation is ascribed to a combination of factors including response to treatment, increasing resistance on the part of the foal and better hygiene and feeding. The general condition of the foal improved greatly. The author emphasizes the need for the use of techniques for the demonstration of both larvae and ova in the diagnosis of *Strongyloides* infections
W. M. Fitzsimmons

1478—FLETCHER, R. B., 1960. ["Melrose", Coursing Batch, Glastonbury, Somerset, U.K.] "*Dictyocaulus arnfieldi* infestation in horses." [Correspondence.] **Veterinary Record**, **72** (50), 1171. The author describes an outbreak of *Dictyocaulus arnfieldi* among horses at a riding school. Six out of eight animals had *D. arnfieldi* larvae in the faeces. Treatment was with diethylcarbamazine citrate (100 c.c. daily in drinking water for three days). Fourteen days later faecal examinations were negative. The source of the infection could not be traced. K. R. Heath

1479—GROOTENHUIS, G., 1957. [Provinciale Gezondheidsdienst voor Dieren, Zeeland, Netherlands.] "Piperazine bij de bestrijding van worminfecties bij het paard." **Tijdschrift voor Diergeneeskunde**, **82** (21), 852-854. [English, French & German summaries p. 854.]

For the annual worming against strongylids and ascarids of draught horses in the second half of winter, a mixture of equal parts of piperazine citrate and phenothiazine is recommended. The evening feed is missed and the medicine is mixed with the following morning feed. The recommended dose of Pipricide (piperazine citrate) is from 30 grammes for foals up to 80 grammes for heavy adult horses. [However, in the table summarizing a trial the maximum doses were administered to a ten-year-old and did not exceed 50 grammes each of Pipricide and phenothiazine.] A stubborn case of *Oxyuris equi* infection in a thoroughbred treated with 80 grammes of Pipricide administered twice at an interval of a few weeks was cured.

W. M. Fitzsimmons

1480—HOLMES, J. W. H., 1960. [81a, Wantage Road, Wallingford, Berks., U.K.] "*Dictyocaulus arnfieldi* infestation in horses." [Correspondence.] **Veterinary Record**, **72** (52), 1238.

The author describes the detection of *Dictyocaulus arnfieldi* larvae in the faeces of three horses affected with coughing. Treatment was with cyanacethydrazide in the food and was satisfactory. K. R. Heath

1481—OŽEGOVIĆ, L., 1960. [Klinika za unutarnje bolesti, Veterinarski fakultet Univerziteta u Sarajevu, Yugoslavia.] "Rezultati laboratorijskih pretraga nekih unutarnjih bolesti konja. I. Kretanje broja eritrocita i količine hemoglobina." **Veterinaria. Sarajevo**, **9** (4), 669-677. [English summary p. 669.]

In parasitic infections of horses (chiefly strongylosis) anaemia, mainly haemolytic, was established, but there were also cases of sideropenic anaemia. N. Jones

1482—WALKER, E. R., 1961. "Parasite control in horses." **Journal of the American Veterinary Medical Association**, **138** (5), 256.

For treatment of horses debilitated by heavy strongyle infections Walker recommends a product containing 53% phenothiazine, 42% carob flour, corn sugar and traces of oil of anise. For mature horses he gives one tablespoonful on food daily for four days and repeats in two weeks. In another two weeks he gives a therapeutic treatment of 6 drachms of carbon disulphide and one pint of a stock solution of phenothiazine (30 gm. per pint), by stomach tube for a horse between 800 and 1,000 lb. weight. A three-month-old colt gets 1/4 pint stock solution and 3 drachms of carbon disulphide. Exercise after worming is recommended. Treatment should be performed twice with a two weeks' interval, thereafter continuous prophylactic treatment with the flour mixture is recommended. A weanling should receive one teaspoonful of the flour mixture for four consecutive days each month and adult horses a tablespoonful in the same way.

W. M. Fitzsimmons

Cattle

1483—BÁTHORY, P. & SZABÓ, L., 1958. "Szarvasmarhák májmételykórjának gyógykezelése izomba fecskendezett széntetrakloriddal a győri járásban." **Magyar Állatorvosok Lapja**, **13** (7), 195-196.

In the treatment of fascioliasis in cattle with carbon tetrachloride there were differences between injections given either into one place or into two places on the neck. Most animals showed restlessness lasting for 15 to 30 minutes after injection and anorexia for one to two days; occasional swellings at the place of injection disappeared within three to ten days. The animals responded to treatment with improved condition and increased milk production. I. Szladits

- 1484—CIELESZKY, V. & KOVÁCS, F., 1958. "Szarvasmarhák széntetrakloridos kezelésének hatása a tejre és tejtermékekre." *Magyar Állatorvosok Lapja*, 13 (10), 279–281. [English & Russian summaries p. 281.]

A maximum of 0.01% of the carbon tetrachloride injected in therapeutic doses not exceeding 20 ml. per animal is excreted in the milk; the amounts are highest during the first two days following treatment, but do not exceed 3 mg. per litre and completely disappear after ten days. The carbon tetrachloride concentration in milk fat increases with an increasing milk fat content, but does not exceed 5 mg. per litre. Only a transient smell, possibly of the killed liver-flukes, could be detected from the milk, and it is suggested that the treatment does not adversely affect any of the milk products. I. Szladits

- 1485—DORSMAN, W., 1957. [Rijksseruminrichting, Rotterdam, Netherlands.] "Variation within a day in the nematode egg-count of the rectal contents of cattle." *Tijdschrift voor Diergeneeskunde*, 82 (18), 655–664. [French, German & Dutch summaries pp. 663–664.]

The strongyle egg count per gramme of faeces from cattle, whether housed or at grass, appears to follow a definite rhythm over 24 hours. The pattern was almost identical in several cows when plotted as a graph. The variation of egg count from day to day is slight if samples are taken at exactly the same time each day. The counts were made hourly at half past the hour. The count was always higher at 8.30 a.m. than at 12.30 p.m., and the latter count always higher than that at 4.30 p.m. The eggs present were those of *Ostertagia ostertagi*, *Cooperia* sp., *Trichostrongylus* sp. and *Oesophagostomum radiatum*. In all, seven graphs are presented, all of which have their high and low peaks of egg counts at corresponding times. Although the number of animals in the study was small, it is felt that the results are significant and merit further investigation because of their practical importance. W. M. Fitzsimmons

- 1486—EHRlich, I., FORENBACHER, S., RIJAVEC, M. & KURELAC, B., 1960. "Istraživanja o akutnoj metiljavosti. II. O Utjecaju atebri na migracioni stadij velikog metilja u organizmu goveda i o mogućnostima liječenja akutne metiljavosti atebriinom." *Veterinarski Arhiv*, 30 (11/12), 307–313. [English & German summaries pp. 312–313.]

Atebrin in distilled water or 25% glucose, in doses ranging from 5 mg. to 25 mg. per kg. body-weight, was administered once or twice within three to five-day-intervals, intravenously or intraperitoneally to 22 cattle with acute fascioliasis. Side effects, consisting of vagotony, started at the dose of 10 mg. per kg., but ceased after 15 to 30 minutes even at a dose of over 20 mg. At autopsy of 10 animals three days after the treatment dead young flukes were recovered from hepatic parenchyma; those from the peritoneal exudate were unaffected. The development of repair processes in the hepatic tissue implied an arrest of the flukes' migration. In four of these animals the lesions were irreparable. Nine animals completely recovered and in three others deterioration was arrested as compared with the controls. N. Jones

- 1487—FISHER, E. W. & McINTYRE, W. I. M., 1960. "Disturbance of respiration of calves caused by pneumonia due to *Dictyocaulus viviparus*. The changes taking place in respiratory rate, ventilation rate, plasma CO₂ content and plasma pH." *Journal of Comparative Pathology and Therapeutics*, 70 (3), 377–384.

The respiratory rate, ventilation rate and the pH and carbon dioxide levels of the plasma were measured in calves suffering from pneumonia caused by *Dictyocaulus viviparus*. The infected calves showed an increase in ventilation and respiratory rate indicating shallower respiration. The carbon dioxide plasma level was much higher in the infected calves which indicated a compensated respiratory acidosis but no marked decrease from normal was found in the plasma pH. K. R. Heath

- 1488—FROMUNDA, V. ET AL., 1960. "Tratamentul fasciolezei bovine cu tetraclorură de carbon administrată parenteral." *Lucrările Stiintifice ale Institutului de Patologie și Igiena Animala, Bucharest*, 10, 325–336. [French & Russian summaries pp. 335–336.]

368 cattle were treated for fascioliasis with a mixture of 75% carbon tetrachloride and 25% vaseline oil which contained 1.25% of basic novocain. This mixture remained sterile for long periods, even when artificially contaminated with pathogenic micro-organisms. 6.6 ml. of

the mixture per 100 kg. body-weight, introduced intramuscularly into three different points of the neck was well tolerated. The tolerance and efficacy of the drug were less in subcutaneous applications. A single application of the drug had an efficiency of 95.7% as found at autopsies, whereas single faecal examinations revealed a 91% to 100% efficacy. N. Jones

1489—FROYD, G., 1960. [Veterinary Research Laboratory, Kabete, Kenya.] "Cysticercosis and hydatid disease of cattle in Kenya." *Journal of Parasitology*, **46** (4), 491–496.

Froyd reviews the world literature on surveys of the incidence of cysticerciasis and hydatid in cattle and reports on a study of 1,000 cattle in Kenya (in which 317 *Cysticercus bovis* and 255 *Echinococcus granulosus* carriers were revealed by standard meat inspection methods). The author concludes that the presence of *C. bovis* does not preclude that of *E. granulosus* or vice versa; male cattle were found to contain *C. bovis* more often than females but sex does not appear to influence the presence of *E. granulosus*; there is a slight decrease in the incidence of cysticerciasis with increased age of the host while the reverse is the case with hydatid, although neither figure was statistically significant in the current survey. Despite the difficulty of artificially infecting cattle over the age of nine months it was found that even old cattle harboured undegenerated *C. bovis* cysts which would seem to indicate that they may take longer to degenerate and calcify than was previously believed. W. M. Fitzsimmons

1490—GRÉGOIRE, C., POUPLARD, L., COTTELEER, C., RASE, F. & JAUMIN, J., 1960. [École de Médecine Vétérinaire de Cureghem, Bruxelles, Belgium.] "Prophylaxie de la bronchite vermineuse par la rotation." *Annales de Médecine Vétérinaire*, **104** (4), 181–190.

The authors report on the successful prevention of outbreaks of husk by using a grazing rotation system based on the two principles: (i) that the larvae of *Dictyocaulus* require four days in which to reach the infective stage; (ii) the survival rate of infective larvae is reasonably short on pasture—in spring barely four weeks and in summer one to two weeks. Grazing was divided into nine plots each grazed for four days in rotation, so that the animals returned to a plot 32 days after leaving it. In order to offset the difficulty of rapid overgrowth of herbage during rest in early summer, an early start with grazing is advised—at the beginning of April—so that the first cycle is completed in the first half of May. This rotation is recommended for older animals presumed to be already infected; first-year calves (theoretically free of *Dictyocaulus*) should be kept in a separate paddock to which access by older animals is strictly forbidden at all times. Application of nitrogenous fertilizers to plots immediately after they have been vacated is said to kill many larvae. The necessity for strict adherence to the rotation and the dangers of overlapping are emphasized. W. M. Fitzsimmons

1491—HORVÁTH, J., 1958. "Szarvasmarhák májmételykórjának gyógykezelése izomba fecskendezett széntetrakloriddal a kiskőrösi járásban." *Magyar Állatorvosok Lapja*, **13** (7), 191–194. [English & Russian summaries p. 194.]

Intramuscular injections of 8 ml. to 100 ml. per 100 kg. body-weight of a mixture of equal volumes of carbon tetrachloride and paraffin oil showed an efficiency of 94.2% (as compared with the 50% to 70% efficiency of Distol) against fascioliasis, without any ill effects on the cattle. Care should be taken to maintain a normal calcium level in the blood serum during treatment. Treatment, coupled with proper drainage of pastures and eradication of snails as intermediate hosts of the liver-fluke, provide an effective control of the disease in the district, leading to increased body-weight and milk production in the animals. I. Szladits

1492—KOTLÁN, S. & KOVÁCS, F., 1957. "Szarvasmarhák májmételykórjának gyógykezelése parenterálisan adott széntetrakloriddal. (Előzetes közlemény)." *Magyar Állatorvosok Lapja*, **12** (3), 65–66.

In the treatment of fascioliasis in cattle subcutaneous injection of 8 ml. per 100 kg. body-weight of carbon tetrachloride mixed with equal amounts of paraffin oil caused swellings and the absorption of the chemical was slow. Intramuscular injection of the mixture in a dose of 6 ml. per 100 kg. (up to a total of 30 ml. without any danger of toxicity) distributed in two or three places on the neck was effective, sometimes causing transient restlessness, anorexia and diarrhoea. Animals under treatment should be well supplied with calcium carbonate in the food or with parenteral applications of calcium preparations. I. Szladits

1493—KOVÁCS, F., 1958. "Szarvasmarhák májmételykórjának orvoslása izomba fecskendezett széntetrakloriddal." *Magyar Állatorvosok Lapja*, **13** (5), 118–124. [English & Russian summaries p. 124.]

Up to 90% cure of liver-fluke in cattle, associated with a marked increase in weight and milk production, was obtained by injecting 4 ml. carbon tetrachloride per 100 kg. body-weight (maximum 20 ml.) intramuscularly to three different points of the neck. The chemical should be mixed with an equal volume of paraffin oil, and some local anaesthetic may be added to it to prevent restlessness of the cattle after injection. I. Szladits

1494—LJEŠEVIĆ, Ž., 1957. [Effect of parasitic allergy on the tuberculin test in cattle.] *Acta Veterinaria. Belgrade*, **7** (4), 81–91. [In Serbian: German summary pp. 89–91.]

Tuberculin tests of 395 cattle revealed 362 negative. At autopsy liver-fluke, hydatid disease and warble-fly were found to be present in 299 of these, either in single or in mixed infections, but only in 19 cases was tuberculosis noticed. The influence of parasitic infections on tuberculin tests was insignificant and similar in all cases; it caused the cutaneous swellings in some tuberculosis-free cattle to be larger by 0.5 mm. to 1.0 mm. The influence of parasitic allergy was greater with mammalian than with avian tuberculin. It is concluded that these parasitic infections have no practical significance in the use of tuberculin tests. N. Jones

1495—MARSBOOM, R., PARYS, O. VAN & BRODSKY, M., 1960. "Contribution à l'étude des localisations préférentielles des cysticerques chez le gros bétail en Urundi." *Annales de Médecine Vétérinaire*, **104** (4), 191–196.

Of 2,128 bovine carcasses inspected in Urundi 80.9% were affected with cysticerciasis. The incidence of occurrence of cysts in the different parts of the body was as follows: crural muscles 13%, heart 12.3%, tongue 12.2%, neck muscles 11.2%, "olecranon" [triceps?] muscles 9.9%, diaphragm 7%, adductors of the thigh 6.9%, lungs 5.7%, sub-pleura 5.5%, external masseters 4.8%. The oesophagus and other sites were much less frequently affected. Routine examination of heart, tongue, internal and external masseters only permits diagnosis of 31.1% of cases; 54% are detected if the anterior and posterior "cuts" are included [triceps and thigh muscles?]. If systematic examination of the heart, tongue, internal and external masseters, anterior and posterior "cuts", neck muscles, diaphragm, adductors of the thigh, the sub-pleural region and the lungs is carried out, the percentage of cysticerci detected is increased to 90.3%. In carcasses in which only a single cyst was detected the percentage incidence was as follows: heart 19.4%, tongue 14.9%, muscles of neck 14.2%, crural [thigh] muscles 12.3%, lungs 8.4%, "olecranon" muscles 7.1%, ganglions 5.1%, external masseters 3.8% and diaphragm 3.2%. W. M. Fitzsimmons

1496—NELSON, A. M. R., JONES, B. & PEACOCK, R., 1961. [Veterinary Division, Allen & Hanburys Ltd., Bethnal Green, London, E.2.] "Results of vaccination with lungworm (oral) vaccine in the field in 1960." [Correspondence.] *Veterinary Record*, **73** (7), 153.

The correspondents quote evidence to show that although 1960 was a year climatically very favourable for the development of husk in Britain, the incidence of parasitic bronchitis in vaccinated animals was low. They point out, however, that when susceptible (unvaccinated) and vaccinated animals are mixed on the same pasture, the immunity of the latter may eventually be overcome as a result of heavy pasture contamination derived from the unvaccinated carriers. W. M. Fitzsimmons

1497—OSBORNE, J. C., BATTE, E. G. & BELL, R. R., 1960. [Section of Veterinary Medicine, Department of Animal Husbandry, North Carolina State College, Raleigh, North Carolina, U.S.A.] "The pathology following single infections of *Ostertagia ostertagi* in calves." *Cornell Veterinarian*, **50** (3), 223–235.

Parasite-free calves aged from 38 to 174 days were all successfully infected with a single oral dose of infective larvae of *Ostertagia ostertagi* (7,000 to 175,000 larvae per dose, usually 30,000 to 35,000). Larvae were seen in the gastric glands of the fundic region of the abomasum six hours after dosing. A single larva entered the neck of a gastric gland soon after it contacted the abomasal mucosa (this was also demonstrated *in vitro*). No tissue reaction was noted until

enlargement of the gland began about six days after infection, when small round cell infiltration occurred. 19 days after infection marked leucocytic infiltration around the parasitized gland was evident and oedema of the submucosa was marked. As the size of the developing larva increased the parasitized gland progressively enlarged (but did not ordinarily become cystic) and the adjacent glands were compressed. 23 days after infection the larvae had vacated the majority of parasitized glands after which involution and restoration of the adjacent mucosa to normal was fairly rapid. Gross lesions, seen from early infection onwards, consisted of small or raised whitish plaques on the abomasal mucosa. W. M. Fitzsimmons

- 1498—PARKER, W. H. & VALLELY, T. F., 1960. [Veterinary Investigation Centre, Wolverhampton, Staffs., U.K.] "Symposium on husk. 3. Observations on husk in calves due to *Dictyocaulus viviparus* infestation with special reference to the therapeutic use of diethylcarbamazine." **Veterinary Record**, 72 (48), 1073–1077. [Discussion pp. 1086–1090.]

Treatment of *Dictyocaulus viviparus* infection in calves with diethylcarbamazine is described. The doses are administered intramuscularly at levels of 10 mg. per lb. body-weight for three successive days and a single dose of 20 mg. per lb. The latter dose was the most effective as judged by respiratory rate. Doses of 200 mg. per lb. given by intramuscular or oral route were toxic which gives a wide toxic margin. K. R. Heath

- 1499—SHUMAKOVICH, E. E. & SHILNIKOV, V. I., 1960. [Rearing calves separated from their dams as a prophylactic against dictyocauliasis.] **Veterinariya**, 37 (9), 30–32. [In Russian.]

The total incidence of dictyocauliasis was 12.1% among calves which had been reared in isolated and properly maintained stalls with enclosures, whereas among calves reared on pastures it was 28.7%. The stall enclosure method of rearing resulted also in an increased weight gain. N. Jones

- 1500—SWANSON, L. E. & WADE, A. E., 1961. [Department of Veterinary Science, University of Florida, Gainesville, Florida, U.S.A.] "Combination drug treatment for internal parasite infections of cattle." **Journal of the American Veterinary Medical Association**, 138 (1), 1–6.

Swanson & Wade describe experiments designed to test the effect of a combined anthelmintic mixture containing, as main constituents, piperazine citrate, purified wettable phenothiazine and powdered hexachlorethane. Details of its composition are given. Although chemically compatible, the mixture was unstable and sedimented. There was no therapeutic incompatibility. No toxicity was demonstrated and clinical improvement and reduction in egg counts were noted in parasitized cattle. The mixture is highly efficient against *Haemonchus contortus*, *Oesophagostomum radiatum*, *Trichostrongylus axei*, *Cooperia* spp. and *Ostertagia ostertagi* but had little effect (36%) on *Bunostomum phlebotomum*. The combination is useful under Florida range conditions and effects considerable reduction in labour costs otherwise involved in separate administration of its constituents. W. M. Fitzsimmons

- 1501—SWARBRICK, O., 1961. [Surrey House, Arundel, Sussex, U.K.] "Diethylcarbamazine in the treatment of parasitic bronchitis." [Correspondence.] **Veterinary Record**, 73 (1), 22.

Swarbrick, commenting on a paper by Parker & Vallely, [see abstract No. 1498 above] makes the observation that large doses of diethylcarbamazine given to cattle by intramuscular injection in the treatment of parasitic bronchitis cause considerable pain. He administers the drug by interperitoneal injection and in two years has not noted any ill effects resulting from this method. W. M. Fitzsimmons

- 1502—VENKATARATNAM, A. & KERSHAW, W. E., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] "The distribution of microfilariae of *Onchocerca* spp. in the cow." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 55 (1), 4–5.

- 1503**—WIKERHAUSER, T. & BARTULIĆ, V., 1961. [Institut za zarazne invazione bolesti, Odjel za parazitologiju i invazione bolesti, Veterinarski fakultet u Zagrebu, Zagreb, Yugoslavia.] "Imunobiološka dijagnostika fasciole. I. O vrijednosti somatskog, polisaharidnog i metaboličkog antigena za intrakutani test kod goveda." *Veterinarski Arhiv*, **31** (1/2), 1-7. [English & French summaries pp. 6-7.]

Metabolic, somatic and polysaccharide antigens were used in intradermal reactions on a total of 225 cattle, 170 of which had *Fasciola hepatica* infection. The metabolic antigen was prepared by incubating freshly recovered flukes in sterile Tyrode's solution at 38°C. for 24 hours, centrifuging, then lyophilizing the supernatant liquid and diluting with distilled water before use. The results, as revealed by faecal examination of all animals and by 205 autopsies, showed that: (i) in cattle with hepatic lesions due to fascioliasis 79.5% typical positive reactions (a wheal with a central red area) were obtained with the metabolic antigen, whereas somatic antigen caused 63% and polysaccharide 39% of such reactions; (ii) some of the uninfected animals showed the wheal but without the central red area; (iii) the typical reaction did not necessarily indicate the presence of liver-flukes, nor had its extent any relation to the gravity of the lesions.

N. Jones

Sheep and Goats

- 1504**—BREZA, M. & PAUER, T., 1957. [Veterinárska fakulta VŠP, Košice, Czechoslovakia.] "Nález pásomnice *Avitellina centripunctata* (Rivolta 1874, Gough 1911) u ovce na východnom Slovensku." *Veterinársky Časopis*. Bratislava, **6** (5), 404-407. [English, French, German & Russian summaries pp. 406-407.]

Avitellina centripunctata infection was found together with that of *Moniezia expansa* in a sheep which died suddenly near Košice (Slovakia).

N. Jones

- 1505**—GEORGESCU, L., FROMUNDA, V., STOENESCU, A. & CEFRA NOV, N., 1960. "Cercetări privind eficacitatea antihelmintică și economică a brichetelor cu fenotiazină la ovine în condiții de producție." *Lucrările Stiintifice ale Institutului de Patologie și Igienă Animală, Bucharest*, **10**, 307-324. [French & Russian summaries pp. 323-324.]

The use of phenothiazine in salt bricks was an effective prophylactic measure against strongyle infections in 16,492 sheep. The use of these bricks during the grazing season resulted in an increased productivity and forestalled heavy infections in lambs. It is recommended that the bricks should contain one part of phenothiazine with five parts of salt. This assures the minimum of 0.0125 gm. of phenothiazine per kg. body-weight and the normal consumption of salt.

N. Jones

- 1506**—KASSAI, T., 1957. Vizsgálatok a juhok gócos tüdőférgességéről. I. A juhok gócos tüdőférgességének földrajzi elterjedtségéről." *Magyar Állatorvosok Lapja*, **12** (3), 66-69. [English & Russian summaries pp. 68-69.]

A brief review is given of the occurrence of protostrongylids in various countries, especially in Europe. Investigation of a large number of sheep lungs indicated that nodular verminous bronchitis is more frequent than dictyocauliasis in Hungary. More than half of the infections were caused by *Cystocaulus ocreatus* and *Protostrongylus* spp., while 20% and 10% were caused by *Muellerius capillaris* and *Neostrongylus linearis* respectively.

I. Szladits

- 1507**—KASSAI, T., 1958. "A juhok tüdőférgességeinek orvoslása ditrazinfoszfáttal." *Magyar Állatorvosok Lapja*, **13** (1), 9-13. [English & Russian summaries p. 13.]

Subcutaneous injection into the leg of sheep of ditrazine phosphate in a concentration of 0.2 gm. per kg. in 1:3 aqueous solution killed and caused evacuation from the lungs of *Dictyocaulus* and *Protostrongylus*, but only partially affected *Cystocaulus* parasitizing the lung parenchyma. Heavy infestation with *D. filaria* was controlled by three injections with the chemical, without any harmful effect on the sheep. Addition of 0.5 gm. per kg. piperazine adipate to the food and intramuscular injection of 1 ml. per 10 kg. of carbon tetrachloride in 1:1 mixture with paraffin oil were ineffective.

I. Szladits

- 1508—KATIYAR, R. D. & VARSHNEY, T. R., 1961. [Central Sheep & Wool Research Station, U.P. Rishikesh (Dehra Dun), India.] "Lumbar paralysis in sheep and goats in Uttar Pradesh with special reference to its etiology, prophylaxis and therapy." *Indian Veterinary Journal*, **38** (1), 20–26.

A study of the literature indicates that lumbar paralysis of sheep and goats in India is probably associated with cerebrospinal nematodiasis possibly provoked by the parasite *Setaria cervi*. The disease is seasonal, usually occurring after the rains from October to December. Trials using hetrazan and caricide at a prophylactic dosage of 40 mg. per kg. body-weight and a therapeutic dosage of 100 mg. per kg. were very encouraging. As a prophylactic measure three doses at intervals of 22 to 25 days during the period October to December brought about a reduction of incidence from 13·8% in untreated controls to 2·2% in treated sheep and goats. Clinical cases were treated within one to three days of onset of the attack, usually with only one dose, occasionally with a second dose; the percentage of recovery in treated animals was from 86·5% to 90%, whereas, in untreated controls it was only 8·0% to 10%. Administration of the drug was immediately preceded by dosing with 10 c.c. of 5% copper sulphate solution to close the oesophageal groove. W. M. Fitzsimmons

- 1509—KÓŇA, E., 1957. [Ústav patologickej fyziológie, Veterinárska fakulta VŠP, Košice, Czechoslovakia.] "Elektroforetické vyšetřovanie bielkovinových frakcií krvného séra a peritoneálneho i perikardiálneho exsudátu u oviec, chorých na fasciolózu." *Veterinársky Časopis*, Bratislava, **6** (2), 146–150. [English, French, German & Russian summaries pp. 149–150.]

Electrophoretic studies, involving 36 sheep with fascioliasis, showed that the level of protein fractions was the same in the serum and the peritoneal exudate. In the pericardial exudate this level was somewhat higher while that of gamma-globulins was lower. N. Jones

- 1510—LUNGU, V., STOICAN, E., FROMUNDA, V. & DRĂGUȘIN, A., 1960. "Tratamentul fasciozei ovine cu amestec ulei de tetrachlorură de carbon și hexachloretan prin administrare parenterală." *Lucrările Stiintifice ale Institutului de Patologie și Igienă Animală, Bucharest*, **10**, 337–344. [French & Russian summaries pp. 343–344.]

A mixture of carbon tetrachloride, hexachlorethane and vaseline oil was injected subcutaneously at doses of 5 ml. and 6 ml. to 7 ml. to young and adult sheep respectively. Post-mortems showed the efficacy of the treatment to be 100% against mature and young *Fasciola*. The action of the mixture was optimum about 40 hours after application. The tolerance was greatly increased when 1% of A.L.U. (a Rumanian commercial product) or basic novocain were incorporated into the treatment. N. Jones

- 1511—PAUER, T. & BREZA, M., 1957. [Veterinárska fakulta, Košice, Czechoslovakia.] "Případ cenurózy (*Coenurus cerebralis*) miechy u ovce." [Spinal *Coenurus cerebralis* infection in a sheep.] *Veterinársky Časopis*, **6** (5), 400–403. [English, French, German & Russian summaries p. 403.]

- 1512—STEFAŃSKI, W., 1957. [Zakład Parazytologii i Chorób Inwazyjnych J. W., Puławy, Poland.] "Badania nad leczeniem robaczy płucnej owiec. Cz. II. Próby leczniczego działania niektórych leków przeciworkowych." *Roczniki Nauk Rolniczych. Seria E. Weterynarii*, **68** (2), 121–139. [French & Russian summaries pp. 137–139.]

A number of anthelmintics currently recommended against lungworms in sheep and pigs were tested on sheep infected with *Dictyocaulus filaria* and *Protostrongylus rufescens*. Results were based on faecal and post-mortem examinations; the effect of the drugs on worms *in vitro* was also studied. (i) Sodium fluoride, recommended for pigs, was ineffective in sheep and produced marked side effects. (ii) Gentian violet injected intratracheally proved highly toxic to sheep. (iii) Phenothiazine as two intratracheal injections of a 5% solution with camphor oil and ether in doses of 3 ml. to 8 ml. and repeated after ten days, was not highly effective and produced toxic changes in the lung and liver. (iv) Fouadin: live *D. filaria* and *P. rufescens* were found in all 16 sheep on the 19th day after two intramuscular injections equivalent to 20 ml. per animal; intratracheal injections were also only slightly effective and produced side effects. (v) Emetine cannot be recommended for wide use as it has little or no effect

against various lungworm species and causes considerable losses amongst the treated sheep. Stefański concludes that none of these is as efficient as Lugol's solution which was tested in 1955 [for abstract see Helm. Abs., 24, No. 927a] and which is also less toxic than emetine. G. I. Pozniak

1513—TEWARI, A. N. & IYER, P. K. R., 1960. [Disease Investigation Section, Indian Veterinary Research Institute, Izatnagar, India.] "Localised peritonitis in a goat due to *Setaria cervi*." **Indian Veterinary Journal**, 37 (12), 624–626.

Tewari & Iyer describe and discuss the localized inflammatory reaction in the omentum of a goat arising from *Setaria cervi* infection. Two photomicrographs illustrate the paper. W. M. Fitzsimmons

1514—TEWARI, A. N. & IYER, P. K. R., 1960. [Disease Investigation Section, Indian Veterinary Research Institute, Izatnagar, India.] "Localised lesions in the omentum of goats due to *Taenia* species." **Indian Veterinary Journal**, 37 (12), 627–630.

Cysticercus tenuicollis in goats sometimes has its development arrested at an early stage because of a torsion of the growing parasite on itself. It then acts as a foreign body to which a local reaction occurs in the form of a progressive inflammation which ends in the formation of a granulomatous structure with a central zone of necrosis or calcification surrounded by a thick belt of granulation tissue. The histological changes are described in detail and illustrated by five photomicrographs. W. M. Fitzsimmons

1515—TEWARI, A. N. & IYER, P. K. R., 1961. [Disease Investigation Section, Indian Veterinary Research Institute, Izatnagar, India.] "Peritonitis in goats caused by *Oesophagostomum* sp." **Indian Veterinary Journal**, 38 (1), 11–16.

Tewari & Iyer record their observations on the histology of *Oesophagostomum* lesions in the intestine, omentum, mesenteric lymph glands and liver of goats. They discuss peritonitis, both local and general, caused by this parasite, and report both positive and negative bacteriological findings in slaughtered animals showing lesions. W. M. Fitzsimmons

1516—TRACH, V. N., 1957. [A new form of female worm of the genus *Haemonchus* Cobb, 1898.] **Zbirnik Prats Zoologichnogo Muzeyu. Institut Zoologii, Akademiya Nauk Ukrainskoi SSR**, No. 28, pp. 116–117. [In Ukrainian: Russian summary p. 117.]

Trach describes and figures female worms of *Haemonchus*, found in two sheep in the Kiev region, which could not be identified with any of the existing species. G. I. Pozniak

1517—UTYAGANOV, A. A. & YUMAEV, K. M., 1960. [The anthelmintic properties of *Ferula* plants.] **Veterinariya**, 37 (9), 40–41. [In Russian.]

The authors have investigated the local habit in the Surkhan-Dari region of grazing helminth-infected sheep on *Ferula*. Several large flocks infected with *Haemonchus* were transferred in the spring to various hill and foot-hill pastures on which *Ferula* (*F. gigantea*, *F. kelifi* and *F. assafoetida*) was growing. The animals ate the *Ferula* particularly readily in the morning, the plants being available for a period of 20 to 25 days. Worms began to be passed on the second day and after two to three days the absence of *Haemonchus* was confirmed in a group examined by autopsy. The sheep remained healthy throughout the summer grazing period. G. I. Pozniak

Pigs

1518—ALICATA, J. E., 1961. [Department of Parasitology, University of Hawaii, Honolulu, Hawaii.] "Failure to establish prenatal ascarid infection in swine." **Veterinary Medicine**, 56 (3), 132–133.

A three-year-old sow, which had been raised on ground contaminated by *Ascaris suum* but the faeces of which were negative for *Ascaris* eggs, was fed about 1,300,000 infective *A. suum* eggs over a period of five weeks in the last third of its pregnancy. No worms became established in the sow and no lesions or ascarid larvae were found in eight of the new born pigs examined post-mortem within one to 48 hours of birth. W. M. Fitzsimmons

- 1519—DE LEON, D. D., TURK, R. D. & HALE, F., 1961. [A. & M. College of Texas, College Station, Texas, U.S.A.] "Observations on the control of *Haematopinus suis* and *Ascaris lumbricoides* of swine with certain organic phosphorus compounds." **Journal of the American Veterinary Medical Association**, 138 (4), 179–183.

In four-month-old pigs naturally infected with *Ascaris lumbricoides* a single oral non-toxic dose of Bayer 21/199 (25%), i.e. 0,0-diethyl 0-(3-chloro-4-methyl-7-coumarinyl) phosphorothioate, at the rate of 6.25 mg. per kg. body-weight had no effect on the parasitic load as determined by faecal egg counts; a single oral non-toxic dose of Bayer L 13/59 (80%), i.e. 0,0-dimethyl-2,2,2-trichloro-1-hydroxyethyl phosphonate, at the rate of 50 mg. per kg. did not reduce the eggs per gramme but when it was given at the rate of 100 mg. per kg. the egg count was much reduced and ascarids were expelled 24 hours after treatment and continued to be passed for five days.

W. M. Fitzsimmons

- 1520—EWING, S. A., TODD, A. C. & DORNEY, R. S., 1960. [Department of Veterinary Science, University of Wisconsin, Madison, U.S.A.] "Efficacy of cyanacethydrazide against swine lungworms." **Journal of the American Veterinary Medical Association**, 137 (11), 654–657.

Pigs were infected with 400 larvae of *Metastrongylus apri* and *M. pudendotectus* and subsequently given three injections of cyanacethydrazide at 15 mg. per kg. body-weight. The treated pigs showed no increased gain in weight when compared with the control animals. Although there was a slight regression of the clinical symptoms of parasitic bronchitis the treated pigs harboured more adult worms than the controls.

K. R. Heath

- *1521—KABATNIK, J., 1958. "Trichinenfunde bei inländischen Schlachtschweinen." **Deutsche Schlacht- und Viehhofzeitung**, 58, 311.

- 1522—KELLEY, G. W. & OLSEN, L. S., 1960. [Department of Animal Pathology, University of Nebraska, Lincoln, Nebraska, U.S.A.] "Critical tests of hygromycin B as an ascaricide of swine." **Cornell Veterinarian**, 50 (1), 60–65.

Hall's critical test, i.e. number of worms expelled by anthelmintic divided by total number of worms present at beginning of test as determined by worm count at post mortem, was used. Hygromycin B fed at 6,000 units per lb. feed was 11% effective against ascarids in pigs when fed for eight days, 75% effective when fed for 14 days and 99% effective when fed for 22 days. The peak of anthelmintic activity when the drug is fed at this rate appears to occur between the 10th and 15th day of feeding. Doubling the dose to 12,000 units of hygromycin B per lb. feed accelerated its action so that 100% of ascarids were expelled in 12 days. Egg production was shown to be impaired by the drug; the number of eggs per gramme of faeces produced by each female ascarid decreases rapidly after about one week of treatment.

W. M. Fitzsimmons

- 1523—KELLEY, G. W. & OLSEN, L. S., 1961. [Department of Veterinary Science, University of Nebraska, Lincoln, Nebraska, U.S.A.] "Evidence against intrauterine infection by swine ascarids." **Veterinary Medicine**, 56 (3), 134.

A gilt was fed 300,000 embryonated eggs of *Ascaris suum* five days of each week in the last five weeks of gestation. No larvae could be demonstrated in the piglets removed by hysterectomy at term, some of which were killed immediately and others after 21 days in isolation units. This study supports previous evidence that *A. suum* is probably not transmitted through the placenta.

W. M. Fitzsimmons

- 1524—LARSH, Jr., J. E. & GOULSON, H. T., 1959. [Department of Parasitology, School of Public Health, University of North Carolina, Chapel Hill, North Carolina.] "A preliminary experiment in swine to determine the effectiveness of cadmium oxide against *Trichinella spiralis*." **Journal of the Elisha Mitchell Scientific Society**, 75 (1), 19–21.

Two young pigs were given a basic feed containing 0.015% cadmium oxide; two other pigs were given an unmedicated basic feed. All these pigs were then infected with *Trichinella spiralis* in graded doses of 10,000, 20,000 and 30,000 larvae at 7, 21 and 42 days after beginning their respective diets. Another pig was given the unmedicated basic feed but was not infected. All pigs were weighed and killed six to seven weeks after the last infection, and the number of *T. spiralis* larvae encysted in the musculature of half-carasses was determined. Examination

of these half-carasses revealed an average of 129,580 larvae in the treated pigs and 1,781,233 larvae in the infected control pigs. This represents more than a thirteen-fold reduction of *T. spiralis* larvae in those pigs dosed with 0.015% cadmium oxide. Larsh & Goulson compare these results with those of a previous study [see abstract No. 1554 below] where a similar reduction of *T. spiralis* larvae was found in mice dosed with 0.015% cadmium oxide. The treated pigs did not gain weight at the same rate as the two infected pigs and one uninfected control.

J. W. Smith

1525—ORLOV, I. V. & MOSKALEV, B. S., 1960. [Eradication of helminthiasis in pigs.] *Veterinariya*, **37** (11), 31–35. [In Russian.]

Rabbits and Hares

1526—LAGRAULET, J., 1957. "Chorio-rétinite onchocerquienne expérimentale chez le lapin. (Premiers résultats)." *Bulletin des Sociétés d'Ophtalmologie de France*, Year 1957, No. 1, pp. 8–13.

Lagraulet describes experiments designed to reproduce the chorio-retinal lesions of onchocerciasis in order to prove the hypothesis that they may be caused by toxins emanating from dead microfilariae, especially after treatment. Six rabbits were used. Rabbits one and two were injected intravenously with 1 c.c. of a suspension of dead microfilariae in physiological serum for 10 consecutive days. Rabbits three and four were injected intravenously with 1 c.c. of a microfilariae-free extract of *Onchocerca* cysts for 10 consecutive days. Rabbits five and six each received an intraorbital implantation of one *Onchocerca* cyst near the summit of the orbit. Immediately before killing, rabbits one, two, three and four showed no lesions in the depth of the eye, rabbits five and six showed chorio-retinal lesions near the optic papilla and the ora serrata consisted of circumscribed pigmented areas, less definite in rabbit six. The rabbits were killed on the 45th and 46th days. Serial sections of the eyes showed no well defined histological lesions in rabbits one, two, three, four and six. In rabbit five there was a thickening of the choroid at certain points accompanied by considerable pigmentary migration and vaso-dilatation. With reservation, these preliminary experiments provide an argument in favour of the toxic theory.

W. M. Fitzsimmons

1527—SADIKHOV, I. A., 1958. [Institut zoologii, Akademiya nauk Azerbaidzhanskoi SSR.] [The helminth fauna of *Lepus europaeus* L. in Azerbaidzhan.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 322–326. [In Russian.]

Of 27 *Lepus europaeus* in Azerbaidzhan, 22 had helminth infections, namely, *Trichocephalus leporis* in 17, *Micipsella numidica* in ten, *Passalurus ambiguus* in four, *Mosgovoyia pectinata* in three, *Trichostrongylus colubriformis* in one and *T. retortaeformis* in one.

N. Jones

1528—SCHILLING, B. VON & HENRÍQUEZ L., M., 1957. [Departamento de Anatomía Patológica del Instituto de Medicina Experimental, Universidad Central de Venezuela, Caracas, Venezuela.] "Infección natural de *Lepus cuniculus* por *Schistosoma mansoni*." *Revista Latinoamericana de Anatomía Patológica*, Caracas, **1** (2), 103–108. [English summary p. 107.]

In Caracas four domestic rabbits were found to have granulomata and *Schistosoma mansoni* in the liver and in one instance in the wall of the large intestine also. It is suggested that these instances of natural infection may indicate that the rabbit may serve as a reservoir host.

N. Jones

Cats and Dogs

1529—CARLOS, E. R. & DIRECTO, A. C., 1960. "A clinical trial of dichlorophenarsine hydrochloride in treatment of canine heartworm infection." *Journal of the American Veterinary Medical Association*, **137** (12), 717–720.

107 household dogs in varying degrees of physical condition and *Dirofilaria immitis* infection were treated intravenously with dichlorophenarsine hydrochloride at the rate of 3.0 mg.

(0.75 mg. of arsenic) per kg. body-weight per day for two consecutive days. All except four severely affected cases, which died as a result of lowered arsenic tolerance, made a satisfactory recovery. In the Philippines, where the vector is active throughout the year, prophylactic administration of the drug should be carried out every six months.

W. M. Fitzsimmons

- 1530**—COHEN, R. H., 1961. "Clinical evaluation of an injectable iron preparation for the treatment of anemia in hookworm-infected dogs." *Journal of the American Veterinary Medical Association*, **138** (2), 94-96.

This paper deals with the therapy of hookworm infection, principally of pre-natal origin, in pups during the first two weeks of life. At this age illness is severe and mortality high. Seven litters were each divided into groups of treated pups and untreated controls. The treated pups each received one intramuscular injection containing 12.5 mg. of injectable iron (colloidal ferric oxide); two of these received a second injection 10 days after the first. Of the 23 treated pups, three died; of the 18 controls, 11 died. In eight to ten days after treatment haemoglobin levels were raised 1.0 gm. to 2.0 gm. per 100 ml. of blood and these were further increased in those which received a second injection. In the surviving controls the increase in haemoglobin was from nothing to 0.5 gm. per 100 ml. of blood. Later studies showed that an even more favourable response resulted from simultaneous injection of iron and the specific, injectable, anti-hookworm drug DNP (American Cyanamid Co.).

W. M. Fitzsimmons

- 1531**—FITZSIMMONS, W. M., 1961. [Commonwealth Bureau of Helminthology, St. Albans, Herts, England.] "Observations on the parasites of the domestic cat." *Veterinary Medicine*, **56** (2), 68-69.

In addition to protozoan and arthropod parasites the following helminth parasites are recorded from the domestic cat in Nyasaland: *Hydatigera taeniaeformis*, *Dipylidium sexcoronatum*, *Joyeuxiella pasqualei*, *Mesocestoides lineatus*, *Ancylostoma tubaeforme*, *Bronchostrongylus subcrenatus* and *Chlamydonema praeputiale*. Brief notes on aetiology and pathology of some of these species are added. *A. tubaeforme* is morphologically and physiologically distinct from *A. caninum* found in dogs in the same locality. *Mabuya striata* (a lizard) is recorded as a secondary intermediate host for *J. pasqualei*.

W. M. Fitzsimmons

- 1532**—FUKAMACHI, H., 1960. [Clinical Department, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] [Experimental studies on the periodicity of microfilariae. I. Provoking effect of stress stimuli upon the migration to the peripheral circulation of microfilariae.] *Endemic Diseases Bulletin of Nagasaki University*, **2** (1), 27-38. [In Japanese: English summary pp. 37-38.]

In dogs infected with *Dirofilaria immitis*, a considerable increase in the number of microfilariae in the peripheral circulation in the daytime was found to be caused by an application of electro- and cardiazol-shock, by a subcutaneous injection with acetylcholine or pilocarpine, and by an intravenous injection with communin. Other chemical stimuli did not affect the microfilarial count. Fukamachi concluded that the microfilarial periodicity was probably due to a parasympathetic stimulation in the host.

Y. Yamao

- 1533**—KATAMINE, D., YOSHIMURA, O. & SAKAGUCHI, Y., 1960. [Clinical Department, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] [Experimental studies on the periodicity of microfilariae. III. Influence of artificial hypothermia of the host upon the migration of microfilariae to the peripheral blood.] *Endemic Diseases Bulletin of Nagasaki University*, **2** (3), 203-211. [In Japanese: English summary p. 211.]

The authors have shown that when the temperature of dogs infected with *Dirofilaria immitis* is artificially lowered for a period of 48 hours there is a loss of microfilarial periodicity and decrease in the numbers in the peripheral circulation. On the fifth day after the experiment, circulating microfilariae had increased in number and had resumed their normal nocturnal periodicity. The effectiveness of diethylcarbamazine and acetylcholine in provoking peripheral microfilariae was demonstrated even in a dog whose temperature was experimentally lowered.

Y. Yamao

- 1534—KRISHNASWAMI, A. K. & PATTANAYAK, S. P., 1959. [Malaria Institute of India, Delhi, India.] "Unsuccessful attempts at active immunisation of dogs against *D. repens* infection." **Bulletin of the National Society of India for Malaria and Other Mosquito-Borne Diseases**, 7 (1), 31.

In this brief note Krishnaswami & Pattanayak report that suspensions of dried infective larvae of *Dirofilaria repens* injected subcutaneously into dogs did not appear to induce any immunity against a challenging infection of 100 infective larvae of *D. repens*. J. W. Smith

- 1535—LIU, S. K., 1957. "Observations on diagnosis of parasites of small animals." **Memoirs of the College of Agriculture, National Taiwan University**, 4 (4), 46-50. [Chinese summary p. 50.]

- 1536—MULLINS, J. C. & GRAGG, J. E., 1960. "Proteolytic enzymes for therapy of pneumonitis following heartworm therapy in dogs." **Journal of the American Veterinary Medical Association**, 137 (12), 710-711.

In dogs successfully treated for *Dirofilaria immitis* infection with arsenical and antimony compounds post-treatment mortality resulting from pneumonia due to infarct formation in the lungs is high in spite of antibiotic therapy. Five case reports (all treated with caparsolate sodium) show how the pneumonia was successfully treated with combined antibiotic and enzyme therapy. W. M. Fitzsimmons

- *1537—OTTEN, E., 1957. "*Capillaria plica*-Befall bei einer Dackelhündin." **Kleintier-Praxis**, 2 (4), 114-116. [English summary.]

- 1538—POTSELUEVA-SAKHNO, V. A., 1958. [Nauchno-issledovatel'skiy institut veterinarii, Kazakhskaya Akademiya sel'skokhozyaistvennikh nauk, U.S.S.R.] [The development of *Taenia pisiformis* Bloch, 1780 in dogs.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 285-286. [In Russian.]

As a result of feeding *Cysticercus pisiformis* to dogs at various intervals it is confirmed that any immunity induced by this tapeworm is very weak. N. Jones

- 1539—TAGUCHI, M., TAKEHARA, B. & URIU, I., 1959. [Laboratories Division, Kanagawa Prefectural Health Department, Yokohama, Japan.] [Aberrant *Dirofilaria immitis* in the lateral ventricles of the brain in a dog.] **Journal of the Japan Veterinary Medical Association**, 12 (10), 430-432. [In Japanese: English summary p. 432.]

Adult worms of *Dirofilaria immitis* were seen in the lateral ventricles of the brain of a dog which died with rabies-like symptoms. The symptoms and anatomico- and histo-pathological findings are given. Y. Yamao

- 1540—TURK, R. D., 1960. [Department of Veterinary Parasitology, A. & M. College of Texas, College Station, Texas, U.S.A.] "Occurrence of the nematode *Spirocerca lupi* in unusual locations." **Journal of the American Veterinary Medical Association**, 137 (12), 721-722.

Spirocerca lupi is recorded from two unusual sites in the dog. A mature male and a female containing embryonated eggs were found in a small subcutaneous abscess in the inguinal region and a single specimen was found in the capsule of a kidney of a dog with chronic nephritis. The nephritis is not thought to be related to the presence of the nematode.

W. M. Fitzsimmons

- 1541—WALLENSTEIN, W. L. & TIBOLA, B. J., 1960. [Livestock Sanitary Service Laboratory, University of Maryland, College Park, Md., U.S.A.] "Survey of canine filariasis in a Maryland area—incidence of *Dirofilaria immitis* and *Dipetalonema*." **Journal of the American Veterinary Medical Association**, 137 (12), 712-716.

528 dogs, mostly from the vicinity of Hyattsville, Maryland, U.S.A., were examined for filariasis. 1.0 ml. of venous or heart blood was collected into 10.0 c.c. of a 2% formalin solution, refrigerated, and later examined by Knott's concentration method with a modification of the staining method which is described in detail. The importance for accurate diagnosis

of using techniques other than microscopic examination of a blood smear alone is emphasized. 6.63% were infected with *Dirofilaria immitis* only, 5.3% with *Dipetalonema* sp. only and 1.14% with both. *D. immitis* occurred four times more often in males than in females and *Dipetalonema* sp. one-and-a-half times more often. Mixed infections were equally distributed between both sexes. The highest infection rate occurred between the ages of 8 to 10 years. The breed incidence is tabulated and is highest for the Boxer. W. M. Fitzsimmons

1542—WEBB, J. L. & NADEAU, F., 1958. "Recherches sur l'incidence de la spirocerose et de la dirofilariose, deux causes de mort subite du chien." *Revue Agricole et Sucrière de l'Île Maurice*, 37 (3), 159-162.

Spirocerca lupi was found in 43 dogs and *Dirofilaria immitis* in 3 dogs autopsied in Mauritius. N. Jones

1543—YOKOGAWA, M., YOSHIMURA, H. & OSHIMA, T., 1960. [Department of Parasitology, School of Medicine, Chiba University, Chiba, Japan.] [Studies on the experimental infection of dogs with a single metacercaria of *Paragonimus westermani*.] *Japanese Journal of Parasitology*, 9 (6), 636-640. [In Japanese: English summary p. 640.]

One metacercaria of *Paragonimus westermani* was given to each of seven puppies. Three puppies became infected with the lung fluke and three others appeared to be infected but no worm was found. The worm found in the pleural cavity 85 days after the infection was immature. The two worms found in the mediastinum 142 days after infection were also still immature. No egg formation was seen. Y. Yamao

1544—YOSHIDA, Y., OKAMOTO, K., HIGO, A. & IMAI, K., 1960. [Department of Medical Zoology, Kyoto Prefectural University of Medicine, Kyoto, Japan.] [Studies on the development of *Necator americanus* in young dogs.] *Japanese Journal of Parasitology*, 9 (6), 735-743. [In Japanese: English summary pp. 742-743.]

Yoshida *et al.* investigated the infection of dogs one to three months old with *Necator americanus* larvae. The active larvae penetrated the skin of the dogs and mature worms developed. Y. Yamao

Laboratory Animals

1545—ANDRADE, Z. A. ET AL., 1957. [Laboratório de Patologia do Instituto de Saúde Pública (Fundação Gonçalo Moniz), Salvador, Bahia, Brazil.] "Comportamento das lesões da esquistossomose experimental em ratos tratados pela DL-Etionina." *Arquivos Brasileiros de Medicina*, 47 (3/4), 111-120. [English summary p. 119.]

Disturbance of protein metabolism resulting in degenerative changes of liver tissue resembling incipient cirrhosis occurred when white rats were fed DL-Ethionine, a synthetic amino-acid. Active schistosomiasis of the liver appears to aggravate these changes. It is suggested that although no exactly parallel morbid liver changes occur in man, individuals with various types of malnutrition may present similar changes although they develop much more slowly and progressively and that these changes may be aggravated by the presence of active schistosomiasis lesions. W. M. Fitzsimmons

1546—BADALYAN, A. L., 1958. [Institut epidemiologii i gigieni, Ministerstvo zdравookhraneniya SSR.] [Resistance of white mice to experimental superinfections with *Hymenolepis*.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 50-54. [In Russian.]

Badalyan used some 283 white mice in experimental infections with eggs of *Hymenolepis nana* from children. In single experimental infections there were cysticercoids in the intestinal villi on the fourth, fifth—and in one mouse—on the seventh day. In the case of repeated infections these larvae and tapeworms were found when the intervals between infections ranged from one to five days. Adults only were found when the intervals ranged from 10 to 60 days. Although the resistance to superinfection may be stimulated by the larval form, this resistance is well expressed during the presence of the intestinal form. N. Jones

- 1547—COORAY, G. H. & PANABOKKE, R. G., 1960. [Department of Pathology, University of Ceylon, Colombo, Ceylon.] "Granulomatous peritonitis caused by *Ascaris ova*." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (4), 358–361.

Intraperitoneal injection of *Ascaris lumbricoides* ova into adult rats gave rise to changes varying with the duration of infection. Granulomata can be seen in the omentum after one week which by one month become small, and by three-and-a-half months disappear. In the reported human cases the ova may have escaped into the peritoneal cavity through a necrotic viscus or a small perforation. This type of peritonitis should be kept in mind in tropical countries.

W. K. Dunscombe

- 1548—GARKAVI, B. L., 1958. [Krasnodarskaya nauchno-issledovatel'skaya veterinarnaya stantsiya, U.S.S.R.] [Mice—intermediate hosts of *Hymenolepis fraterna* (Stiles, 1906).] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 93–95. [In Russian.]

Garkavi fed mesenteric lymph node tissue of mice infected with *Hymenolepis fraterna* to three other mice. Four more mice received cysticercoids on the 28th day of their development in the lymph nodes. At post-mortem, carried out 12 days after infection in the first case and on the 9th day in the second there were respectively two and five sexually mature tapeworms. It is confirmed that mice may play the role of an intermediate host.

N. Jones

- 1549—HEARNshaw, G., LEYTHAM, G. W., BREWSTER, D. J. & KERSHAW, W. E., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] "Changes in animal behaviour and intelligence on infection with schistosomiasis." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 55 (1), 3.

- 1550—HEWITT, R. & GILL, E., 1960. [Animal Science Department, Research Laboratories, Agricultural Division, American Cyanamid Company, Pearl River, New York, U.S.A.] "The 'lung shift' of *Schistosoma mansoni* in mice following therapy with tartar emetic or miracid D." **American Journal of Tropical Medicine and Hygiene**, 9 (4), 402–409.

Female white mice were inoculated intraperitoneally with 80 to 90 cercariae of *Schistosoma mansoni*. Following various regimens of therapy with tartar emetic and miracid D from 8 to 12 weeks after infection, pronounced shifts of mature *S. mansoni* to the lungs occurred in contrast to the relatively few worms found in the lungs of untreated controls. The magnitude of these lung shifts sometimes equalled or surpassed the collateral hepatic shifts induced by therapy. Unpaired worms outnumbered paired worms in the lungs with varying ratios of males to females. Many dead worms were recovered from the lungs of treated mice from two to four weeks after the initial dosage. Many worms found within the lungs of treated mice were as active as those observed in the mesenteric vessels of untreated controls, particularly during the first necropsy periods after dosage. The lung shift provides an additional criterion for evaluating antischistosome activity of chemical compounds in mice, supplementing information derived from the usual examination at necropsy of the mesentery, portal vein and liver. Hewitt & Gill discuss the implications of possible analogous responses to therapy in human schistosomiasis.

J. W. Smith

- 1551—HIGASHI, T., 1960. [Department of Veterinary Science, College of Agriculture, University of Osaka Prefecture, Sakai, Osaka, Japan.] [Infection mechanisms of helminth and pathological studies on the effect of intestinal microorganisms relationship between *B. subtilis* and a mechanism of infection with *Fasciola hepatica*. 1. Parasitological observations on guinea-pigs.] **Japanese Journal of Parasitology**, 9 (5), 470–479. [In Japanese: English summary p. 479.]

A suspension of *Bacillus subtilis*, a common but specific intestinal micro-organism of herbivores was administered orally to guinea-pigs. Metacercariae of *Fasciola hepatica* were then given to the guinea-pigs and the interrelationship between the presence of micro-organisms and the infection mechanism of *F. hepatica* through the intestine. The infection rate was 75% without the micro-organism and 100% in the presence of *B. subtilis*. The number of parasites was 2.75 in the controls but 26.7, 24.2 and 11.5 in animals who had received three different strains of *B. subtilis*, respectively. Pathological investigations revealed remarkable changes in peritoneal inflammation, especially in abdominal dropsy, and in hepatic degeneration followed by an increase of the death rate in the animals.

Y. Yamao

- 1552—HIGASHI, T., 1960. [Department of Veterinary Science, College of Agriculture, University of Osaka Prefecture, Sakai, Osaka, Japan.] [Infection mechanism of helminths and pathological studies on the effect of intestinal microorganisms. II. Pathological observations on guinea-pigs.] **Japanese Journal of Parasitology**, 9 (6), 673–684. [In Japanese; English summary p. 684.]

During infection with *Fasciola hepatica*, an administration of *Bacillus subtilis* brought about a higher death rate of guinea-pigs; this resulted from a remarkable increase in both the infection rate and in the number of parasites. Experimental results suggested that the penetration of the Gram-positive bacilli into the liver tissues supported and reinforced the *F. hepatica* parasitism. Y. Yamao

- 1553—HSÜ, H. F. & HSÜ, S. Y. LI, 1960. [Department of Hygiene & Preventive Medicine, College of Medicine, State University of Iowa, Iowa City, Iowa, U.S.A.] “Distribution of eggs of different geographic strains of *Schistosoma japonicum* in the viscera of infected hamsters and mice.” **American Journal of Tropical Medicine and Hygiene**, 9 (3), 240–247.

Hsü & Hsü used the Chinese, Formosan, Japanese and Philippine strains of *Schistosoma japonicum*. The distribution of eggs of these four geographical strains were studied in the viscera of hamsters and mice. Statistical analyses of the results are tabulated and show that the percentage distributions of schistosome eggs in the visceral organs of the host were influenced by the strain of parasite, the species of host and the intensity of infection. J. W. Smith

- 1554—LARSH, Jr., J. E., GOULSON, H. T. & YARINSKY, A., 1958. [Department of Parasitology, University of North Carolina, Chapel Hill, North Carolina, U.S.A.] “The control of repeated infections with *Trichinella spiralis* in mice by the use of feed containing cadmium oxide.” **Journal of the Elisha Mitchell Scientific Society**, 74 (2), 137–140.

In controlled experiments with 128 mice Larsh *et al.* found that mice given a feed containing 0.015% cadmium oxide harboured significantly fewer *Trichinella spiralis* larvae and adults following either single or repeated infections with *T. spiralis* larvae than mice not given the drug. The lower worm burden of experimental, as compared with control mice following a single infection of *T. spiralis* was due entirely to the action of the drug; the lower worm burden following second and third infections was due to a combination of the effects of both the drug and the immunity acquired from the previous infection(s). As immunity is increased it seems that its direct effect upon the worms is to make them more susceptible to the drug. The present results suggest that trichinelliasis in mice can be effectively controlled by the addition of 0.015% cadmium oxide to the feed. [For abstract of further work involving the use of cadmium oxide in controlling swine trichinelliasis see No. 1524 above.] J. W. Smith

- 1555—LUBINSKY, G., 1960. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] “A vegetatively propagated strain of larval *Echinococcus multilocularis*.” **Canadian Journal of Zoology**, 38 (6), 1117–1125.

Lubinsky reports on the vegetative propagation of *Echinococcus multilocularis sibiricensis* in rodent hosts. He has made 11 successive transfers in cotton-rats and established sub-strains in gerbils and white mice. A gradual increase in the growth rate is noted. Cotton-rats infected with seventh transfer material may contain cysts comprising 25% of the total body weight after 70 days, while after the tenth transfer the growth rate was “considerably higher”. Lubinsky states that gerbils are the animal of choice for maintaining a strain of secondary hydatid because the growth rate is lower, the volume of cysts is about one-half that in cotton-rats of similar age, and the host survival time is longer. Development in white mice after intraperitoneal and subcutaneous injection is slow, but after several months most cysts are fertile. Observations on variations of the number of rostellar hooks in different populations are discussed. G. A. Webster

- 1556—PENA DE GRIMALDO, E., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] “The results of intensive exposure of white mice to acute *Schistosoma mansoni* infections.” [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 55 (1), 5.

- 1557**—PHILLIPSON, R. F. & KERSHAW, W. E., 1960. [Department of Parasitology & Entomology, Liverpool School of Tropical Medicine, Liverpool, England.] "The production, deposition and growth of the larvae of *Trichinella spiralis*, and their significance in the chemotherapy of the infection. I. Introduction, summary of experimental results, and discussion." *Annals of Tropical Medicine and Parasitology*, **54** (2), 250–251.

When mice were experimentally infected with *Trichinella spiralis* larvae none were recovered from the muscles until the sixth day. The numbers then increased steadily until the 15th day, became coiled and encased in cysts on the 17th day and were then infective to new hosts. Any drug intended to destroy the larvae must therefore be administered before the 15th day. But as infections in man cannot be diagnosed clinically before the 10th to 14th day the search for a drug to reduce the production of larvae by the female worms would probably be unrewarding. The markedly beneficial effect of cortisone suggests that the clinical symptoms arise from the general reactions of the host to the parasites and not from their direct action on the host.

R. T. Leiper

- 1558**—ROBINSON, Jr., E. J., 1960. [Department of Biology, Kenyon College, Gambier, Ohio, U.S.A.] "Survival and developmental aberrations in *Schistosoma mansoni* following the administration of stilbestrol to the hosts." *Journal of Helminthology*, **34** (1/2), 81–84.

Robinson infected Swiss albino mice with cercariae of a Puerto Rican strain of *Schistosoma mansoni* obtained from *Australorbis glabratus*, and studied the effects of frequent and heavy injections of stilboestrol during the first seven weeks of the worms' development. Experimental mice showed a significant reduction in the worm burden, a tendency for the worms to remain in the liver and a retardation of sexual development of male and female worms. About 5% of the males had supernumerary gonads posterior to the normal testes and 24% had accessory gonadal tissue which was probably ovarian in nature. There was also a reduction of approximately one third in the size of the male worms. Robinson discusses some of the possible explanations of these results.

D. L. H. Robinson

- 1559**—SHIKHOBALOVA, N. P., KARMANOVA, E. M. & SHEKHTMAN, Y. L., 1958. [Effect of X-rays and gamma-rays on *Trichinella*.] *Vestnik Selskokhozyaistvennoi Nauki*, **3** (5), 77–83. [In Russian: English & German summaries pp. 82–83.]

White mice were fed on *Trichinella* larvae irradiated with 1 to 30,000r. and, as controls, with non-irradiated larvae. The results show that male worms were more susceptible to irradiation than females. After a dose of 2,400 to 6,000r. the average number of embryos per female was 0.3 to 0.7 (only 3% to 8% of females contained embryos) while in controls it was nine. 5,000r. may be considered sterilizing; thus almost all irradiated larvae developed into sterile intestinal forms (of which there were a considerably smaller number than in controls) and give rise only to very occasional larvae in the muscles.

G. I. Pozniak

- 1560**—STRETCH, R. G. A., LEYTHAM, G. W. H. & KERSHAW, W. E., 1960. [Department of Parasitology & Entomology, Liverpool School of Tropical Medicine, and the Department of Psychology, University of Liverpool, Liverpool, U.K.] "The effect of acute schistosomiasis upon learning in rats under different levels of motivation." *Annals of Tropical Medicine and Parasitology*, **54** (4), 487–492.

Further experiments showed that in hooded rats acute infection with 500 *Schistosoma mansoni* cercariae produced a state of lethargy. Under different strengths of drive, by an underwater swimming test, the optimum level of motivation for a task of standard difficulty was apparently higher in infected animals than in the controls.

R. T. Leiper

- 1561**—STRETCH, R. G. A., STRETCH, S. J. E. & KERSHAW, W. E., 1960. [Liverpool School of Tropical Medicine, Liverpool, U.K.] "Metabolism and intelligence in animal schistosomiasis." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **54** (4), 291.

- 1562**—STRETCH, R. G. A., STRETCH, S. J. E., LEYTHAM, G. W. H. & KERSHAW, W. E., 1960. [Department of Parasitology & Entomology, Liverpool School of Tropical Medicine, Liverpool, U.K.] "The effect of schistosomiasis upon discrimination learning and activity in mice. I. An acute infection." *Annals of Tropical Medicine and Parasitology*, **54** (3), 376–380.

Stretch *et al.* confirm the principle established by Kershaw *et al.* in 1959 [for abstract see Helm. Abs., **29**, No. 1206] that acute infection with schistosomiasis retards learning ability in rodents. Using albino mice in water-maze discrimination and activity experiments, uninfected mice displayed a more active and variable pattern of behaviour than mice infected with schistosomiasis. The authors illustrate the results of their work by means of graphs.

J. W. Smith

- 1563**—STRETCH, S. J. E., STRETCH, R. G. A., LEYTHAM, G. W. H. & KERSHAW, W. E., 1960. [Department of Parasitology & Entomology, Liverpool School of Tropical Medicine, and the Department of Psychology, University of Liverpool, Liverpool, U.K.] "Discrimination learning and schistosomiasis in the rat: a low-grade infection of several months' duration." *Annals of Tropical Medicine and Parasitology*, **54** (4), 483–486.

Continuing Kershaw, Leytham & Dickerson's inquiry (1959) [for abstract see Helm. Abs., **29**, No. 1206] into the effect of schistosome infection in rats on discrimination training 12 hooded rats were exposed to 500 *Schistosoma mansoni* cercariae and 11 were maintained under uniform conditions as a control group. The results showed that discrimination learning in a multiple "T" maze was not retarded by low-grade schistosome infection.

R. T. Leiper

Poultry

- 1564**—BOLDIREVA, N. V., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR.] [Differences in the distribution of radio-active phosphorus in the tissues of healthy chicks and those infected with *Syngamus*.] *Papers on Helminthology presented to Akademician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 86–88. [In Russian.]

Boldireva administered radio-active phosphorus, in the form of sodium phosphate, subcutaneously to eight to ten-week-old chickens. At the end of 48 hours more radio-active phosphorus was found in the organs of those chickens experimentally infected with *Syngamus skrjabinomorpha* than in the controls and the rate of accumulation of phosphorus in the trachea and lungs was slower in the case of infected birds. The maximum quantity of the radio-active element in the parasites corresponded with the maximum in the trachea.

N. Jones

- *1565**—DYK, V., KLIMEŠ, B. & ZAVADIL, R., 1957. "Cizopasníci a invazní choroby drůbeže." [Parasites and infectious diseases of poultry.] *Prague: Č.S.A.Z.V.*, 181 pp.

- 1566**—FERRI, A. G., CORREA, W. M. & MARTINS, L. F., 1960. [Departamento de Histologia e Embriologia da Faculdade de Medicina Veterinária, Universidade de São Paulo, Brazil.] "A roundworm of the duck beak epidermis." *Poultry Science*, **39** (2), 490–492.

Ferri *et al.* report the finding of a capillariid nematode parasitizing the epidermal tissue of the beaks of ducks. Free biopericulate eggs measuring 21μ to 27μ by 50μ to 55μ (operculum 5.5μ) were found in the Malpighian layer and in the more superficial layers of the epidermis. The nearer they were to the surface, the more mature the ova became, so that those found in the keratinized layer often contained larvae. It appears as if the worm uses the physiological shedding of epidermis as a means of releasing its larvae to the exterior. Nematodes and eggs were demonstrated by histological sections. Eggs could also be demonstrated in epidermal scrapings. Details of techniques for demonstration are given. Photomicrographs of sections stained by haematoxylin and eosin and of a scraping illuminated by phase contrast are included. Larvae were about 60μ to 70μ long; transverse sections of adult worms had a maximum diameter of 52μ to 61μ .

W. M. Fitzsimmons

1567—FOSTER, III, R. G., RYAN, C. B., TURK, R. D. & QUISENBERRY, J. H., 1960. [Texas A. & M. College System, College Station, Texas, U.S.A.] "Continuous feeding of hygromycin as a poultry anthelmintic and its effect upon laying house performance." *Poultry Science*, **39** (2), 492-499.

Three rations (i) a basal starter as control, (ii) the basal ration plus 6 gm. hygromycin B per ton, (iii) the basal ration plus 12 gm. hygromycin B per ton, were fed to separate groups of a total of 1,133 pullets in the first 20 weeks of life. The basal starter ration was then changed to a laying one but the distribution of hygromycin was unaltered. Every four weeks from the first four weeks of life samples of birds were checked post mortem for the presence of ascarids, heterakids and tapeworms until the groups were 20 weeks of age and then at weekly intervals for a further seven weeks. Throughout the whole period the birds were exposed to worm infection. Infections with cestodes were insignificant throughout so that no conclusions could be drawn. Both the numbers of birds parasitized and the numbers of nematodes per bird were lowest in the group receiving 12 gm. of hygromycin per ton and highest in the control groups. W. M. Fitzsimmons

1568—KUCHAŘOVÁ, F., BAŠTÁŘ, M. & ZAJÍČEK, D., 1957. [Štátní vědecký veterinární ústav, Prague, Czechoslovakia.] "Nález některých neobvyklých parazitů u kachen." *Veterinářský Časopis*. Bratislava, **6** (5), 408-415. [English, French, German & Russian summaries p. 415.]

Post-mortem examinations of ducks, from the neighbourhood of Prague, revealed the presence of *Hemicleptis tessalata* in the nasal cavities. 13 ducks harboured *Tetrameres fissispina* in the proventriculus. Seven of these birds were also infected with *Hymenolepis anatina*. N. Jones

1569—LONG, P. L., 1957. [Houghton Poultry Research Station, Houghton, Huntingdon, England.] "An account of a serious infestation with gapeworms (*Syngamus trachea*) in growing turkeys." *World's Poultry Science Journal*, **13** (4), 288-290.

Long discusses the factors which led to an outbreak of *Syngamus trachea* infection on a farm of about 2,000 turkeys. The author states that a large percentage of the turkeys showed typical symptoms and that gapeworms were seen in about a quarter of the birds examined [numbers not given]. Starlings may have been the source of infection. Large numbers of *Eisenia foetida* were found beneath the litter in the turkey pens; 18 one-week-old chickens fed macerated earthworms became infected. Mowrah meal was effective in controlling the earthworms. Treatment of the infection in young turkeys by blowing barium antimonyl tartrate into a small wooden hut containing the birds was unsuccessful. J. W. Smith

1570—MOLNÁR, I., 1958. "Adatok a syngamosis gyógykezeléséhez." *Magyar Állatorvosok Lapja*, **13** (10), 282-283. [English & Russian summaries p. 283.]

Inhalation of barium antimonyl tartrate by means of a specially constructed inhaler was more easily performed in the treatment of chickens with *Syngamus* than mechanical removal of worms from the trachea, directly or in combination with painting with an anthelmintic or applying drops of dilute Lugol's solution or 5% sodium salicylate. I. Szladits

1571—PELLÉRDY, L., 1957. "A baromfi parazitás betegségei elleni védekezés új eredményei." *Magyar Állatorvosok Lapja*, **12** (1/2), 31-34.

A brief account is given [with no references] of chemotherapeutic means of controlling black-head, threadworm and *Syngamus trachea* in chickens and turkeys. I. Szladits

1572—POLÁKOVÁ, M., 1957. "Adipát piperazinu při askaridiose a heterakidose slepic." *Sborník Československé Akademie Zemědělských Věd Veterinární Medicina*, **30** (12), 865-880. [English, German & Russian summaries pp. 877-880.]

Searching for the optimal dose of piperazine adipate for the field treatment of chickens, Poláková has used 0.25 gm. per kg. body-weight (in pills) on 34 birds with ascaridiasis (a statistically significant number) and 24 with heterakiasis. The results were calculated on the relation between the number of worms passed and that found on autopsy 88 to 112 hours after the treatment. The efficacy against ascaridiasis was 97.83% in 32 chickens (in two an atypical result of only 22% was obtained) and against heterakiasis 23.20%. Poláková therefore suggests that 0.4 gm. per kg. will more likely prove to be the optimal dose. G. I. Pozniak

1573—SAWADA, I., 1960. [Biological Laboratory, Nara Gakugei University, Nara, Japan.] [On the daily periodicity in the segment discharge of birds infected with tapeworms.] **Japanese Journal of Parasitology**, 9 (5), 464–469. [In Japanese: English summary p. 469.]

In *Raillietina kashiwarensis* and *R. cesticillus* the greatest numbers of segments were discharged between 2.00 p.m. and 4.00 p.m., while none was seen during the night or early morning. In contrast, in *R. echinobothrida* they appeared between 4.00 p.m. and 6.00 p.m. and a small number was found during the night. The periodical shedding of the senile segments was controlled by physiological factors in the alimentary canals of fowls, not by internal factors in the tapeworms. When the infected chickens began to moult the numbers of segments in the droppings began to decrease and eventually there were none. The relationship between the beginning of moulting and the decrease in the production of segments was unknown.

Y. Yamao

1574—SHLEIKUS, P. & TATARINTSEVAITE, A., 1960. [Ukmerskaya mezhrainnaya vetlaboratoriya, Lithuanian S.S.R.] [*Echinoparyphium* infection—a new helminthiasis in the Lithuanian S.S.R.] **Veterinariya**, 37 (9), 53. [In Russian.]

Echinoparyphium recurvatum is reported for the first time in Lithuania. It was observed among three to four-month-old goslings and adult geese. At a co-operative farm, where this infection and *Drepanidotaenia lanceolata* were found, 0.2 ml. per kg. body-weight of male fern extract gave good therapeutic results. 2 ml. to 5 ml. of carbon tetrachloride per goose gave good results against *E. recurvatum* in pure infections or combined with *Amidostomum anseris* and *Echinostoma revolutum*; it was also effective against mixed infections of *E. revolutum* and *Drepanidotaenia lanceolata*.

N. Jones

1575—STOICAN, E., MARCU, M., POP, M., LEPAĐATU, C., 1960. "Cercetări privind acțiunea antihelmintică a fenotiazinei în tratamentul unor parazitoze la rațe și curci." **Lucrările Stiintifice ale Institutului de Patologie și Igienă Animală, Bucharest**, 10, 353–360. [French & Russian summaries pp. 359–360.]

Phenothiazine in doses of 0.3 gm., 0.5 gm., 0.7 gm. and 1.0 gm. per kg. body-weight was given with one quarter of the morning food to ducks and turkeys. It was found that 1.0 gm. per kg., repeated after 10 days in ducks and after 15 days in turkeys, gave the best anthelmintic results. The efficacy of this dose in the case of ducks was against trichostrongylosis 82.2% and against capillariasis 72.3%. Among turkeys it was 78.2% against ascaridiasis and 93% against heterakiasis. The treatment was well tolerated and resulted in increased weight gain and egg output.

N. Jones

1576—STOIMENOV, K. A., 1960. [Kolarovgradskaya mezhrainnaya veterinarnaya stantsiya, Bulgaria.] [Treating chickens against early stages of ascaridiasis.] **Veterinariya**, 37 (9), 48–49. [In Russian.]

Worming of young chickens with ascaridole, when they had just started to pass *Ascaridia galli* eggs (2½ months of age) and again at the age of four months, resulted in the eradication of this infection in one village after two years. The incidence and degree of infection in the control village remained unchanged.

N. Jones

***1577**—TOLGAY, N., 1957. "Ankara ve civarı tavuklarında tesadüf edilen barsak nematod'ları üzerinde sistematik araştırmalar." [Intestinal nematodes of fowl in the Ankara region.] **Veteriner Fakültesi Yayınları. Ankara Üniversitesi**, No. 89, 45 pp. [English summary.]

Other Mammals

1578—BELOPOLSKAYA, M. M., 1960. [The helminth fauna of *Phoca vitulina largha* Pall.] **Vestnik Leningradskogo Universiteta. Seriya Biologii**, 15 (3), 113–121. [In Russian: English summary p. 121.]

The following helminths are reported from eight *Phoca vitulina largha* from the Sudzkhinsk preserve in the Sea of Japan: *Phocitrema fusiforme*, *Trigonocotyle skrjabini*, *Diplogonoporus mutabilis* n.sp., *Anisakis* (larvae), *Phocascaris phocae*, *Terranova decipiens*, *Terranova* sp. (young males which differed from *T. decipiens*), *Otostrongylus circumlitus* and *Corynosoma osmeri*.

All except *T. decipiens* and *O. circumlitus* are new for *Phoca vitulina*, while the only helminths known previously for *P. v. largha* were *T. decipiens* and *C. strumosum*. The new species, *D. mutabilis*, differs from the other three species in the genus, *D. balanopterae*, *D. septentrionalis* and *D. grandis*, chiefly in the varying number of genital complexes (two to four or even five) and the varying position of the female pores in relation to the male pore, but also in the absence of longitudinal furrows on the strobila, the size of the strobila, seminal vesicle, genital bursa and eggs, and the shape of the scolex.

G. I. Pozniak

1579—BERNARD, J., 1960. [Station d'Entomologie, Gembloux, Belgium.] "Sur trois cas de cysticercose grave chez des campagnols (Rodentia-Microtidae)." **Annales de Parasitologie Humaine et Comparée**, **35** (3), 243–250.

42 and 60 specimens of *Cysticercus fasciolaris* were found in two *Arvicola terrestris terrestris*. In one of them two cysticerci were also found in the lungs. Numerous cysticerci of *Taenia crassiceps* and four *T. taeniaeformis* strobilocerci were found in the liver of a *Microtus arvalis*, the general body-cavity of which was filled with *T. crassiceps* cysticerci; most of these had daughter cysts.

N. Jones

1580—BOEV, S. N., 1958. [Institut zoologii AN Kazakhskoi SSR.] [Coenuriasis of the muscle in *Capra sibirica*.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 79–85. [In Russian.]

The finding of *Coenurus skrjabini* in a *Capra sibirica* from the zoological garden of Alma-Ata in 1937 was reported by Boev & Sokolova in 1949. Its specific diagnosis was confirmed by experimentally infecting a puppy. One of the mature proglottides is illustrated.

N. Jones

1581—EBLE, H., 1957. [Zoologisches Institut, Martin-Luther-Universität, Halle-Wittenberg, East Germany.] "Befall der Bismarratten durch *Cysticercus fasciolaris* im Gebiet der DDR." **Wissenschaftliche Zeitschrift der Martin-Luther-Universität Halle-Wittenberg. Mathematisch-Naturwissenschaftliche Reihe**, **6** (1), 159–165.

28% of 300 musk-rats caught in East Germany were infected with *Cysticercus fasciolaris*. Two-thirds of the infected animals were males. Variation in rate and intensities of infection are considered in relation to resistance, to the age and biology of the hosts and the degree of contamination of the water habitat.

G. I. Pozniak

1582—FRANDSEN, J. C., 1960. [University of Utah, U.S.A.] "Endoparasitism in isolated populations of rodents of the Lake Bonneville Basin, Utah." **Dissertation Abstracts**, **21** (5), 1297.

1583—FREEMAN, R. S. & WRIGHT, K. A., 1960. [Ontario Research Foundation, Toronto, Canada.] "Factors concerned with the epizootiology of *Capillaria hepatica* (Bancroft, 1893) (Nematoda) in a population of *Peromyscus maniculatus* in Algonquin Park, Canada." **Journal of Parasitology**, **46** (3), 373–382.

Freeman & Wright found *Capillaria hepatica* frequently in *Peromyscus maniculatus* in Algonquin Park, Ontario, and occasionally in *Ondatra zibethica*, *Clethrionomys gapperi*, *Microtus pennsylvanicus*, *Napaeozapus insignis* and *Synaptomys cooperi*, the latter four being new host records. Experimental infections were established by feeding embryonated eggs to *Mus musculus*, *P. leucopus* and *Tamiasciurus hudsonicus*, the two latter being new host records. *Tamias striatus* and *Cavia porcellus* were resistant to infection. The incidence of *C. hepatica* in a wild population of *P. maniculatus* varied directly with the density of the host from year to year (1952 through 1955) and declined from May through September in each year. The fact that only 0.8% of 769 deer mice examined in four summers harboured larval stages of certain carnivore cestodes suggests limited contact of *P. maniculatus* with carnivore faeces, which are not likely to be the primary source of *C. hepatica* eggs for *P. maniculatus*. Few *C. hepatica* eggs were found to be released directly into the faeces of the infected host and starvation did not increase the number. Thus Freeman & Wright postulate release of eggs from the liver by cannibalism, and their accumulation, development and subsequent ingestion by *P. maniculatus* in the winter nest as the primary dispersal mechanism for *C. hepatica* among the population of *P. maniculatus* studied.

E. I. Sillman

- 1584—JANSEN, Jr., J., 1961. [Instituut voor Veterinaire Parasitologie en Parasitaire Ziekten der Rijksuniversiteit, Utrecht, Netherlands.] "*Echinococcus granulosus* bij het edelhert (*Cervus elaphus*)."
Tijdschrift voor Diergeneeskunde, 86 (2), 82-84. [English, French & German summaries pp. 83-84.]

The lungs of two of 53 red deer (*Cervus elaphus*) from Imbosch, Gelderland (Netherlands), were found to contain cysts of *Echinococcus granulosus*. The source of infection is thought to be the dog and not the fox which is not considered to be a normal host of *E. granulosus*. The use of viscera from game as dog food is deplored and the need for proper meat inspection of wild animals destined for human and animal consumption is indicated.

W. M. Fitzsimmons

- 1585—KORNEEV, A. P. & KOVAL, V. P., 1958. [A study of the helminth fauna of some mammals in the Ukraine.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 161-166. [In Russian.]

On examination in the Ukraine, two of four martens, all of 18 wolves, 136 of 145 foxes, three of nine raccoon-like dogs, 235 of 445 hares and none of four otters were infected with helminths. The six species of trematodes, six of cestodes, nine of nematodes and one of acanthocephalans are listed under hosts. One specimen of *Rossicotrema donicum*, a species rare in Carnivora in Russia, is described from a marten. In the measurements of the body, other organs and eggs the specimen resembles, however, *R. venustus* known from North American Insectivora.

G. I. Pozniak

- 1586—MACHULSKI, S. N., 1958. [Buryatski zoovetinstitut, U.S.S.R.] [The helminth fauna of rodents in the Buryat A.S.S.R.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 219-224. [In Russian.]

48.2% of 1,444 rodents (31 species) examined in the Buryat Mongol A.S.S.R. were infected with helminths. The three species of trematodes, 18 of cestodes, 31 of nematodes and two of acanthocephalans are listed with data on the rate of infection of individual hosts.

G. I. Pozniak

- 1587—MERKUSHEVA, I. V., 1958. [Otdel zoologii i parazitologii, Akademiya Nauk Byelorusskoi SSR, U.S.S.R.] [The trematode fauna of rodents and insectivores in the Byelorussian S.S.R.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 225-227. [In Russian.]

The following eleven trematodes are reported, with details of previous records for Russia, from rodents and insectivores in the Byelorussian S.S.R. (White Russia): *Fasciola hepatica* in *Lepus europaeus*; *Psilotrema simillimum*, *P. spiculigerum*, *Notocotylus noyeri* and *Quinqueserialis wolgensis* in *Arvicola terrestris*, *Skrjabinomerus petrowi* and *Itygonimus talpae* in *Talpa europea*; *Dolichosaccus exasperatum*, *Opisthioglyphe sobolevi* and an unidentified lecithodendriid in *Sorex araneus*; and *Alaria alata* in *Apodemus agrarius*, *Clethrionomys glareolus* and *Glis glis*.

G. I. Pozniak

- 1588—MOROZOV, Y. F., 1958. [Gosudarstvenni zapovednik "Belovezhskaya pushcha", U.S.S.R.] [The biology of dictyocaulids from wild ungulates of the Belovezha (Białowieża) forests.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 243-246. [In Russian.]

Dictyocaulus viviparus infection was observed in 23 of 32 bison, and *D. eckerti* in red deer and roe-deer. The worms recovered from deer kept in enclosures were smaller than those from free deer. Experimental infections produced adult *D. viviparus* in a calf after 25 to 30 days and after 30 to 38 days in a young deer, which had fewer larvae in the faeces. *D. eckerti* developed to the adult stage in one of two calves after 80 to 90 days, the other calf remaining uninfected, whereas in a young deer it developed after 24 days. Attempts to infect a lamb and a rabbit with *D. eckerti* were unsuccessful. Dictyocaulid larvae did not survive the winter and desiccation limited their life span. Experiments with coprophagous beetles (*Geotrupes stercorarius* and *G. stercorosus*) showed that these carried the parasites' larvae from the faeces into the soil.

N. Jones

1589—MYERS, B. J. & KUNTZ, R. E., 1960. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Nematode parasites from vertebrates taken on Lan Yü, Formosa. I. Nematodes from *Rattus rattus*." *Canadian Journal of Zoology*, **38** (5), 857–858.

The nematodes recovered from 80 rats on Lan Yü, Formosa, were identified as: *Capillaria* sp., *Globocephalus* sp., *Gongylonema orientale*, *Heterakis spumosa*, *Nippostrongylus braziliensis*, *Protospirura muricola*, *Rictularia tani* and *Syphacia* sp. W. G. Inglis

1590—PARAMANANTHAN, D. C. & DISSANAIKE, A. S., 1960. [Department of Parasitology, University of Ceylon, Colombo 8, Ceylon.] "Sylvatic *Echinococcus* infection in Ceylon." [Correspondence.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **54** (6), 601.

Paramanathan & Dissanaïke found adult *Echinococcus* in a jackal killed in the jungle at Mankulum in the Northern Province of Ceylon. The authors believe that a sylvatic cycle exists between wild carnivores and jungle herbivores. G. A. Webster

1591—PROKOPIČ, J. & JAROS, Z., 1961. [Biologický ústav ČSAV parazitologie a Zoologická zahrada, Praha, Czechoslovakia.] "Helmintologické nálezy u exotických šelem v pražské zoologické zahradě." *Věstník Československé Zoologické Společnosti*, **25** (1), 22–24. [Russian summary p. 23.]

Autopsy of two *Felis chaus*, one *F. silvestris silvestris*, one *F. silvestris ornata*, one *Panthera leo* and one *Ursus arctos* from the zoological garden of Prague, revealed the presence of eleven helminth species only four of which had been recorded in Czechoslovakia. *Taenia laticollis* was recovered from both *F. chaus* and it is mentioned that hitherto this parasite had been known from *Lynx lynx* and *L. canadensis* in the U.S.A. N. Jones

1592—ROMANOV, I. V., 1958. [Gorkovski meditsinski institut, U.S.S.R.] [The helminth fauna of *Vulpes vulpes* in the Krasnoyarsk territory.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 297–301. [In Russian.]

Examination of 84 wild foxes from various areas of the Krasnoyarsk territory showed the following infections: *Alaria alata* (72·6%), *Echinococcus multilocularis* (55·9%), *Taenia polyacantha* (52·4%), *T. crassiceps* (20·2%), *Mesocostoides lineatus* (17·8%), *Capillaria plica* (90·5%), *Toxascaris leonina* (64·3%), *Toxocara canis* (33·3%), *Physaloptera sibirica* (16·7%), *Uncinaria stenocephala* (15·5%) and *Thominx aerophilus* (100%). A short description is given for *T. aerophilus* as its measurements differed from those given in the literature. The Krasnoyarsk territory is a natural focus of *E. multilocularis*. G. I. Pozniak

1593—ROMASHOV, V. A., 1958. [Voronezhski gosudarstvenni zapovednik, U.S.S.R.] [The epizootology of *Opisthorchis* infections in the Voronezh preserve.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 302–305. [In Russian.]

One of 263 *Castor fiber* examined was infected with *Opisthorchis felineus*; this is recorded for the first time from this host. *O. felineus* were also found in one of two *Vulpes vulpes*, in one of four cats and in the one *Lutreola lutreola* examined. Altogether 16 mammalian species, a duck and a kingfisher were examined. Seven out of 230 *Bithymia leachi* contained larvae of this parasite and its metacercariae were found in all of seven ide and nine of 22 roach. One pike and two perch were uninfected. Experimental infection of a beaver with 25 metacercariae resulted in finding 11 adult *O. felineus* in the liver about six weeks later. N. Jones

1594—STRONG, J. P., MCGILL, Jr., H. C. & MILLER, J. H., 1961. [Departments of Pathology and Tropical Medicine & Medical Parasitology, Louisiana State University School of Medicine, New Orleans, Louisiana, U.S.A.] "Schistosomiasis mansonii in the Kenya baboon." *American Journal of Tropical Medicine and Hygiene*, **10** (1), 25–32.

Strong *et al.* examined 150 baboons (*Papio doguera*) of varying age and of both sexes from Kenya. 42% were infected with *Schistosoma mansonii*. The distribution of *S. mansonii* in the tissues of the baboons and the pathogenesis of lesions in the colon and liver (illustrated by photomicrographs) were similar to those found in mild human infections. Measures to control human schistosomiasis should take into account the possibility that the baboon is an important reservoir host. The authors suggest that the baboon is an excellent experimental animal for research in schistosomiasis. J. W. Smith

- 1595—WANTLAND, W. W., KEMPLE, H. M., BEERS, G. R. & DYE, K. E., 1957. [Illinois Wesleyan University, Bloomington, Illinois, U.S.A.] "*Cysticercus fasciolaris* and *Capillaria hepatica* in *Rattus norvegicus*." **Transactions of the Illinois State Academy of Science**, Year 1956, **49**, 177–181.
- Wantland *et al.* examined the livers of 532 wild *Rattus norvegicus* and found 428 infected with *Cysticercus fasciolaris* strobilocerci and 127 infected with *Capillaria hepatica*. Cysticerci from individual rats were from one to 13 in number and from 2 mm. to 9 mm. in diameter. The livers of five rats infected with *C. fasciolaris* showed cellular and tissue changes which may lead in some cases to liver sarcoma, but no definite liver tumours were observed. Six cats fed cysticerci developed *Taenia taeniaeformis* adults 70 to 90 days later. Rats show a high tolerance to heavy (experimental) infections of *T. taeniaeformis*.
J. W. Smith

Other Birds

- 1596—CLARK, G. M., O'MEARA, D. & VAN WEELDEN, J. W., 1958. [Bureau of Sport Fisheries and Wildlife, U.S. Fish and Wildlife Service, Laurel, Maryland, U.S.A.] "An epizootic among eider ducks involving an acanthocephalid worm." **Journal of Wildlife Management**, **22** (2), 204–205.

Clark *et al.* examined six of many eider ducks (*Somateria mollissima dresseri*) reported dead and dying in Massachusetts in 1957 and found them to be infected with from 38 to 235 *Polymorphus botulus*. Many worms had penetrated the intestinal wall of the host and were projecting into the abdominal cavity. The gizzards of all six ducks were infected with *Amidostomum* sp. The authors state that three kidney flukes and a nasal mite were recovered from one bird. *P. botulus* is holarctic in distribution and may be a major contributing factor to epizootics among eider ducks. Photographs show four whole expanded specimens of the parasite and a length of infected intestine of an eider duck.
J. W. Smith

- 1597—JONES, Jr., J., 1960. [Ohio State University, U.S.A.] "A survey of the parasites of the eastern crow, *Corvus brachyrhynchos brachyrhynchos* Brehm, 1822, in Ohio." **Dissertation Abstracts**, **21** (4), 998–999.

- 1598—MAKARENKO, V. K., 1958. [Change in the helminth fauna of birds in relation to ecological conditions.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 211–215. [In Russian.]
- The helminth fauna of birds of the Central Urals was studied in relation to their habitats and feeding habits. The birds most frequently infected with trematodes were the insect-eaters from water-meadows and then those with a mixed grain and insect diet from forests and from water-meadows; cestodes were most frequent in birds with the mixed diet from forests and then in the insect-eating birds from water-meadows. Nematodes reached the highest incidence in birds of prey. In migratory and non-migratory birds the incidence of helminthiasis generally, and that of trematodes and cestodes, was similar but nematodes were more frequent in the latter; there was also a distinct difference in the specific composition of helminths in these two groups of birds.
N. Jones

- 1599—MURHAR, B. M., 1960. [Department of Zoology, M.M. College of Science, Nagpur, India.] "On the new host record of the trematode *Basantisia ramai* Pande (subfamily Basantisininae Yamaguti 1958) from the pigeon, *Columba domestica* Gmelin at Nagpur." **Bulletin of the Zoological Society, College of Science, Nagpur**, **3**, 79–81.

Five specimens of *Basantisia ramai* were collected from the intestine of *Columba domestica* at Nagpur, India; this is a new host record. Murhar describes and figures *B. ramai*. His material differs from that originally described by Pande (1938) from the intestine of *Ceryle raddis leucomanara* in the following: the anterior region of the body is well provided with longitudinal muscle; the body is relatively smaller; the ratio of the oral sucker to the acetabulum is 6:7; the pharynx and oesophagus are larger; the ovary is pear-shaped and is situated below the level of the acetabulum; and the testes are spindle-shaped. The author does not consider these structural differences sufficient to justify creating a new species. A table shows comparative measurements of the specimens of *B. ramai* from the two hosts.
J. W. Smith

1600—SOKOLOVA, G. A., 1959. [The parasite fauna of *Fringilla coelebs* L.] **Vestnik Leningradskogo Universiteta. Seriya Biologii**, 14 (3), 83–90. [In Russian: English summary pp. 89–90.] The parasites from 143 *Fringilla coelebs* from the gardens of the Botanical Institute in Leningrad included four trematode, two cestode and three nematode species. The dependence of the parasite fauna on the age, food and migration of this bird host is discussed. G. I. Pozniak

1601—SWENNEN, C. & BROEK, E. VAN DEN, 1960. [Instituut voor Veterinaire Parasitologie en Parasitaire Ziekten, Utrecht, Netherlands.] "*Polymorphus botulus* als parasiet bij de eidereenden in de Waddenzee." **Ardea. Tijdschrift der Nederlandse Ornithologische Unie**, 48 (1/2), 90–97. [English summary p. 96.]

Swennen & van den Broek describe an epidemic in eider ducks on the Waddenzee (Holland) attributed to the acanthocephalan *Polymorphus botulus* which, according to Rayski belongs to a separate genus *Profilicollis* (Meyer, 1931) [for abstract see Helm. Abs., 29, No. 660]. They give a short redescription of the parasite and review the literature on similar epidemics. During the summer of 1957 it was estimated that there was a morbidity of 15% and a mortality of 5% in the colony. The rapid increase in the duck population since the second world war and favourable summer conditions for the increase of the unknown intermediate host are suggested as possible contributory factors but the authors point out that the hypothesis requires testing by further study of the biology of the parasite and the feeding habits of the duck.

W. M. Fitzsimmons

1602—TANAKA, M., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on *Trichobilharzia physellae* in Oki Islands. 1. *Trichobilharzia physellae* found in wild ducks in Oki Islands.] **Japanese Journal of Parasitology**, 9 (5), 596–603. [In Japanese: English summary p. 603.]

Tanaka found *Trichobilharzia physellae* in *Anas poecilorhyncha zonorhyncha* and *A. platyrhynchos platyrhynchos* from Oki Islands.

Y. Yamao

Reptiles and Amphibians

1603—ANDRUSHKO, A. M. & MARKOV, G. S., 1958. [Leningradski gosudarstvenni universitet, Leningrad, U.S.S.R.] [The helminth fauna of reptiles in the Kyzyl-Kum desert.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 32–37. [In Russian.]

Of 20 species of reptiles examined in Kyzyl-Kum in Central Asia, ten were infected with helminths. *Oochoristica truncatula* is reported for the first time from *Phrynocephalus helioscopus* and *Thelandros baylisi* and *T. brevicaudatus* from *Agama sanguienta*. The other helminths found were *Pharyngodon tectipenis*, *P. geckinis*, *Abbreviata paradoxa*, *A. uzbekistanika*, *A. turkomanina*, *Skrjabinoptera pallaryi*, *Foleyella candezei* and *Oligacanthorhynchus* sp. The fauna is considered under individual hosts and is compared with that of neighbouring areas.

G. I. Pozniak

1604—ANDRUSHKO, A. M. & MARKOV, G. S., 1960. [Some data on helminths of lizards of the Caucasus and some ecological peculiarities of the helminth fauna of the family Lacertidae.] **Vestnik Leningradskogo Universiteta. Seriya Biologii**, 15 (3), 135–142. [In Russian: English summary pp. 140–141.]

The following helminths were found in four species of lizards examined in the Caucasus: *Pharyngodon tectipenis* and *Spirocerca lupi* (cysts with larvae) in *Eremias arguta*; *Abbreviata abbreviata* in *Lacerta agilis*; *Plagiorchis mentulatus* and *Oochoristica sobolevi* in *L. taurica*; and *Thelandros* sp. in *L. saxicola*. All are new host records. *A. abbreviata*, which is described, is also new for Russia. The specimens of *Thelandros* are described; they are characterized by a short oesophagus, almost median vulva and a long tail two-thirds of which form a spine. In the absence of males, however, the authors refrain from naming this, probably new, species. From this and earlier published work on the helminths of lizards in other areas [see (i) **Vestnik Leningradskogo Universiteta. Seriya Biologii**, 1956, No. 21 (Pt. 4), 61–71 and (ii) abstract No. 1603 above] the authors analyse the helminth fauna according to the age, sex and ecological habitat of the lizards.

G. I. Pozniak

1605—FREITAS, J. F. TEIXEIRA DE, 1960. [Instituto Oswaldo Cruz, Rio de Janeiro, Brazil.] “Rápidas informações sobre hospedeadores e distribuição geográfica de alguns trematódeos parasitos de batráquios.” *Atas da Sociedade de Biologia do Rio de Janeiro*, 4 (3), 29–32.

Trematodes collected from batrachians and a snake on an expedition to Maicuru, Pará, Brazil and others in the collection of the Instituto Oswaldo Cruz are commented on. The following new host records are made: *Glypthelmins linguatula* from *Bufo granulosus*, *B. paracnemis*, *B. crucifer* and *Dryadophis bifossatus*; *G. palmipedis* from *B. granulosus*; and *G. vitellinophilum* and *Catadiscus uruguayensis* from *Lisapsus limellum*. The literature upon, and the known host and geographical records for, these trematodes are summarized in the paper which includes a full bibliography.

W. M. Fitzsimmons

1606—LEES, E. & BASS, L., 1960. [Department of Biological Sciences, Institute of Technology, Bradford, Yorks., U.K.] “Sex hormones as a possible factor influencing the level of parasitization in frogs.” [Correspondence.] *Nature*, London, 188 (4757), 1207–1208.

Lees & Bass have observed that during and immediately before the breeding season the level of parasitization with helminths in male *Rana temporaria* in Britain is considerably higher than in females. This difference of level is much less marked at other times of the year when the female gonads have undergone regression. 25 out of 50 male frogs from a population known to be heavily parasitized were injected with 0.5 mg. of oestradiol benzoate (B.P.) in 20% ethyl oleate and 80% arachis oil in 0.1 mg. doses over a period of 12 days. The remaining 25 served as controls. At the end of three weeks the experimental and control frogs were killed and examined for helminths. The percentages of parasites in the control and experimental frogs respectively were: *Polystoma integerrimum* 16% and 4%; *Gorgoderina vitelliloba* 24% and 12%; *Dolichosaccus rastellus* 12% and 0%; *Haplometra cylindracea* 56% and 40%; *Rhabdias bufonis* 64% and 32%; *Oswaldocruzia filiformis* 80% and 72%; *Cosmocerca ornata* 90% and 72%; and *Acanthocephalus ranae* 20% and 8%. This experiment indicates that the presence of oestradiol brings about a depression of the level of parasitism by helminths. The authors intend to investigate the phenomenon in more detail.

W. M. Fitzsimmons

1607—SHEVCHENKO, N. N. & BARABASHOVA, V. N., 1958. [Kharkovski gosudarstvenni universitet, U.S.S.R.] [Helminth fauna of *Lacerta agilis* L. and *Vipera berus* L. in the Kharkov area.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 389–394. [In Russian.]

The helminths found in 60 *Lacerta agilis* were *Plagiorchis mentulatus*, *Prostotocus* sp., *Oochoristica tuberculata*, *Oswaldocruzia bialata*, *Porrocaecum* sp. and unidentified nematode larvae, and in seven *Vipera berus* they were *Alaria alata*, *Encyclometra natricis*, *Paralepoderma cloacicola*, *Opisthioglyphe ranae*, *Astiotrema monticelli*, *Cercorchis* sp., *Rhabdias fuscovenosus* and unidentified nematode larvae.

G. I. Pozniak

Miscellaneous

1608—ASADOV, S. M., 1958. [Institut zoologii, Akademiya Nauk Azerbaidzhanskoi SSR, U.S.S.R.] [The characteristics of the helminth fauna of ruminants in the lowland zone of Azerbaidzhan S.S.R.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 38–41. [In Russian.]

The helminths of ruminants (gazelles, dromedaries, sheep, goats, cattle, zebu and buffaloes) in the lowlands of Azerbaidzhan are represented by 69 species. An analysis of the distribution of the fauna over the lowland, foothill and mountain zones is made as a basis of planning control.

G. I. Pozniak

1609—BORCHERT, A., 1957. [Ústav pre veterinárnu parazitológiu, Humboldtova univerzita, Berlin, Germany.] “Boj proti motoličnosti.” [Control of fascioliasis.] *Veterinársky časopis*, Bratislava, 6 (2), 111–116.

1610—FRANDSEN, J. C. & GRUNDMANN, A. W., 1960. [Department of Zoology and Entomology, University of Utah, Salt Lake City, U.S.A.] "*Brachylaime microti* from the deer mouse in Utah." *Journal of Parasitology*, **46** (3), 314.

Frandsen & Grundmann report *Brachylaime microti* from the bile-ducts of three *Peromyscus maniculatus sonoriensis*. They add two species to the list of *Brachylaime* species (1935 to 1956) compiled by Kruidenier & Gallicchio [for abstract see Helm. Abs., **29**, No. 1331]; these are *B. oesophagei* Shaldibin, 1954 from *Sorex araneus*, *S. minutus* and *Neomys fodiens* taken in Mordovian A.S.S.R. (European Russia), and *B. tisa* Chatterji, 1958 from *Butastur tisa* taken in Orissa, India.

E. I. Sillman

1611—GILLET, J., 1960. [Service de l'Hygiène de Bukavu (Kivu), Congo.] "Note sur un foyer de bilharziose murine à *Schistosoma rodhaini* Brumpt au Kivu." *Annales de la Société Belge de Médecine Tropicale*, **40** (4), 639–641. [English, German, Spanish & Flemish summaries pp. 640–641.]

Gillet briefly reviews reports concerning the geographical distribution of *Schistosoma rodhaini* and lists the known definitive hosts, natural and experimental, of this parasite, viz., man, eleven rodents, the domestic cat and dog and *Felis serval*. He records this parasite in *Dasymys bentleyae medius* and *Otomys irroratus vulcanius* and *Biomphalaria ruppellii* from a new, very limited focus situated in a marshy bay of Lake Kivu near Bukavu, Congo. W. M. Fitzsimmons

1612—GOLOVIN, O. V., SAVINOV, V. A. & LEVIN, N. A., 1958. [Kalininski pedagogicheski institut, U.S.S.R.] [The helminth fauna of animals acclimatized in the Kalinin region.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 109–113. [In Russian.]

Raccoon-like dogs (37), nutria (19), beavers (seven faecal samples), wild boar (one), roe-deer (one) and pheasants (two) which have been introduced into the Kalinin region from various parts of Russia, were examined for helminths. The helminth fauna was generally low, e.g. only *Trichostrongylus colubriformis* was found in nutria, while the raccoon-like dogs had acquired two new parasites, *Thominx aerophilus* and *Capillaria putorii*. *Physaloptera sibirica*, *Dicrocoelium orientalis* and *Travassosius rufus* have been introduced with their hosts (raccoon-like dogs, roe-deer and beavers respectively) into the region, the first two being new records for Europe. *Setaria* sp. is described from the roe-deer (*Capreolus pygargus*) originally from near Vladivostok. It differs from other species in the genus chiefly by its localization in the spleen (encysted), by the uterus which reaches nearly to the nerve ring and then recurves, and from all except *S. tundra*, *S. pillersi* and *S. bidentata* by the short oesophagus (3.78 mm. to 4.0 mm.).

G. I. Pozniak

1613—HALAŠA, M., LÜBKE, R. & ROŠKO, L., 1957. [Štatni vedecký veterinárni ústav, Bratislava, Czechoslovakia.] "O rozšírení motolíčnosti a plúcnej červivosti oviec a hovädzieho dobytku na Slovensku a perspektívy boja proti nim." *Veterinársky Časopis*. Bratislava, **6** (4), 293–304. [English, French, German & Russian summaries pp. 302–304.]

Halaša *et al.* again draw attention to the great incidence of helminthiasis among cattle and sheep in Slovakia [see also Helm. Abs., **25**, No. 554c].

N. Jones

1614—HALAWANI, A. & GINDY, M., 1957. [Ministry of Public Health, Cairo, Egypt.] "A short account on the economic importance of *Fasciola gigantica*, its effect on livestock and the snail vector." *Journal of the Egyptian Medical Association*, **40** (8), 547–552.

Halawani & Gindy, using data from past surveys, discuss the incidence of fascioliasis amongst live-stock. After a description of the life-cycle of *Fasciola gigantica* the authors discuss the distribution and control of the vector *Lymnaea caillaudi* by the use of copper sulphate and sodium pentachlorophenate.

J. W. Smith

1615—HOLLÓ, F., 1958. "A fenotiazin és alkalmazása a juh gyomor—bélférgessége és a ló vastag-bélférgessége ellen." *Magyar Állatorvosok Lapja*, **13** (2/3), 59–63. [English & Russian summaries p. 63.]

The history and properties of phenothiazine and 25 references to its use are reviewed, and treatment against gastro-intestinal parasites is discussed. Full therapeutic doses recommended are 0.8 gm. to 1 gm. per kg. given in a single treatment to sheep, and three to five treatments

each of 10 gm. per kg. to horses (half this amount to foals) on consecutive days. The full therapeutic treatment should be followed by administering daily 0.2 gm. to 0.5 gm. in a salt lick to sheep and 1 gm. to 2 gm. in the fodder to horses, continued for many months or even for years where necessary. I. Szladits

1616—HORVÁTH, J., 1958. "A májmételeykór elleni védekezés módszereiről." *Magyar Állatorvosok Lapja*, 13 (6), 163–165.

The life-cycle of the liver-fluke and control measures are given in tabular form. The importance of treating affected animals before turning them out to grass early in the season (when pastures are least infested), eradication of snails as intermediate hosts by application of copper sulphate in 1:80,000 dilution, and preventing waterlogging by proper drainage of the pasture is stressed. I. Szladits

***1617**—LEFEVRE, M., 1958. "Essai de traitement des helminthoses de l'appareil broncho-pulmonaire des ruminants et des volailles par les aérosols." *Thesis, Lyons*, 53 pp.

1618—MAZZOTTI, L., 1958. [Laboratorio de Helmintología, Instituto de Salubridad y Enfermedades Tropicales, México, D.F.] "Resultados negativos de la infección experimental de seis zorras de la especie *Urocyon cinereoargenteus*, con *Echinococcus granulosus*." *Revista del Instituto de Salubridad y Enfermedades Tropicales, Mexico*, 18 (2), 63–66. [English summary p. 66.]

Portions of fertile hydatid cysts from pig livers were given to grey foxes (*Urocyon cinereoargenteus*) and to three dogs, while two foxes and one dog received fragments of the proligerous membrane with hydatid sand four times at weekly intervals. At post-mortem two out of three dogs were positive and all the foxes were negative. N. Jones

1619—OLTEANU, G., ET AL., 1960. "Cercetări asupra diagnosticului alergic în echinococoza animalelor domestice." *Lucrările Stiintifice ale Institutului de Patologie și Igienă Animală, Bucharest*, 10, 345–352. [French & Russian summaries pp. 351–352.]

Antigen prepared with hydatid liquid from cysts in the lungs and liver of heavily infected cattle gave 70% to 96% correct intradermal reactions in sheep, goats and cattle. In sheep 70% to 90% correct results were obtained with the antigen preserved with 0.5% chloroform, 75% to 95% with the antigen sterilized by boiling, and 80% to 90% with lyophilized antigen. Fresh hydatid liquid gave 80% to 90% correct reactions in cattle, 75% to 96% in sheep and 90% in goats. The optimum time to diagnose intradermal reactions is after 15 to 30 minutes. N. Jones

1620—PALI, E. T., 1958. [Akushersko-ginekologicheskaya klinika, Azerbaidzhanski meditsinski institut imeni N. Narimanova, U.S.S.R.] [Effect of emulsions of certain intestinal parasites on contractile activity of the uterus.] *Akusherstvo i Ginekologiya, Moscow*, 34 (4), 21–25. [In Russian: English summary p. 25.]

1621—PROKOFEV, A. A., 1960. [Some data on trichinellosis in the Maritime Territory.] *Veterinariya*, 37 (9), 49–52. [In Russian.]

Autopsy of 205 domestic and wild animals in the Maritime Territory, revealed trichinellosis in 7 of 61 cats, 5 of 8 *Mustela sibirica*, 3 of 6 foxes and 2 of 47 *Rattus norvegicus*. This infection was not found in any of 77 dogs or 2 otters. It is concluded that in the region, where the animals were examined, the principal and primary source of trichinellosis is constituted by wild animals. It is suggested that in Vladivostok polecats are probably the main source of trichinellosis, the carcasses of which could be eaten by rodents and some domestic animals. N. Jones

1622—SALATA, A. T., 1958. [Dnepropetrovski meditsinski institut, U.S.S.R.] [The reaction of the body to metabolic products of *Ascaris* in relation to the specific characters of the host.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday, Moscow: Izdatelstvo Akademii Nauk SSSR*, pp. 327–330. [In Russian.]

When metabolic products obtained by keeping pig ascarids in physiological solution were introduced directly into ligatured portions of the intestine of dogs, cats, rabbits, rats and frogs, the absorption of glucose and physiological solution was inhibited in the dogs and cats

as a result of the presence of the products, but no such inhibition was observed in the other animals. (In the frogs only the inhibition of physiological solution was studied.) It is concluded that the inhibition of absorption could be regarded as a protective reaction against ascarid toxins.

N. Jones

- 1623**—SANDOSHAM, A. A., 1957. [Department of Parasitology, University of Malaya, Singapore.] "Malaysian parasites. XXXII. Infection of animals by major groups of helminths: an interim tabulation." **Studies from the Institute for Medical Research, Federation of Malaya**, No. 28, pp. 403–408.

This paper provides a list of 74 mammals, 34 birds and 28 reptiles and amphibians giving their common and scientific names together with information on their food, the total number of each species of host examined, the total number infected and the number of acanthocephalans, nematodes, trematodes and cestodes recovered. It is an interim tabulation and does not give the determination of the parasites within their major groups. It allows a broad correlation between the mode of life of the hosts and the pattern of parasite infection. A few preliminary observations on this subject are made. The methods by which the parasites were collected and preserved are outlined.

W. M. Fitzsimmons

- 1624**—SAVINOV, V. A., 1958. [Kalininski pedagogicheski institut, U.S.S.R.] [The development of helminths in reservoir hosts.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 315–319. [In Russian.]

The morphology and dimensions of *Alaria alata* metacercariae from hedgehogs, moles, martens, weasels, polecats, ermines, an otter, cats, raccoon-like dogs, white mice, a kestrel, pigeons, ducks, chickens and frogs did not differ. Dogs were experimentally infected with metacercariae from tadpoles, frogs, a hedgehog, moles, an otter, white mice and chickens, and were autopsied from 30 hours to 30 days later. The time of development of the parasites and the route of their migration in the dogs did not differ, no matter what the source of the metacercariae.

N. Jones

- 1625**—SCHAD, G. A., KUNTZ, R. E. & WELLS, W. H., 1960. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Nematode parasites from Turkish vertebrates. An annotated list." **Canadian Journal of Zoology**, **38** (5), 949–963.

Schad *et al.* list 56 species of nematodes recovered from 36 species of Turkish vertebrate hosts, comprising one unidentified trout, five species of amphibians, eight species of reptiles, eight species of birds and 14 species of mammals. In addition to presenting information of a taxonomic nature for several species, the authors describe and figure *Heligmosomum* sp., a parasite of *Crocidura russula*, and discuss the value of the dorsal ray in distinguishing between species of the Heligmosomidae. *Aplectana schneideri* is figured with some account of its morphology. Notes are given on the recognition of the genus *Pseudophysaloptera*, and the male of *Rictularia proni* is described and figured. Observations are made on the parasitic stages in the life-history of *Angusticaecum holopterum* and their distribution in the host *Testudo graeca ibera*. 24 references are given.

J. W. Smith

- 1626**—SCHAEFFLER, W. F., 1960 & 1961. [Department of Veterinary Pathology & Hygiene, College of Veterinary Medicine, University of Illinois, Urbana, U.S.A.] "Visceral larva migrans and related diseases in animals." **Illinois Veterinarian**, **3** (4), 99–102; 1961, **4** (1), 13–18.

- 1627**—SULTANOV, M. A., 1958. [Institut zoologii i parazitologii, Akademiya nauk Uz SSR, U.S.S.R.] [Trematodes of domestic and wild birds of Uzbekistan.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 364–368. [In Russian.]

Sultanov lists 66 species of trematodes from birds in Uzbekistan. 4.4% of 1,139 domestic birds and 13.5% of 1,283 wild birds were infected.

G. I. Pozniak

- ***1628**—TIKHONOV, G. V., 1958. [Practical laboratory studies in veterinary parasitology.] **Moscow: Selkhozgiz**, 204 pp. [In Russian.]

1629—VASILKOV, G. V., 1958. [Helminthology in animal husbandry.] *Vestnik Selskokhozyaistvennoi Nauki*, 3 (12), 59–63. [In Russian: English & German summaries p. 63.]

1630—WALLEY, J. K., 1960. "Symposium on husk. 2. The use of cyanacethydrazide." *Veterinary Record*, 72 (48), 1068–1072. [Discussion pp. 1086–1090.]

A review is given of the work published on the treatment of *Dictyocaulus viviparus* infection in calves, *D. filaria* in sheep and *Metastrongylus apri* in pigs. With cyanacethydrazide the dose level recommended for treatment is 17.5 mg. per kg. body-weight given orally, and 15 mg. per kg. by the subcutaneous route. The maximum dose for cattle is 5 gm. and for sheep 1 gm. A single treatment clears some 65% of the worms but three treatments on successive days are recommended in severely infected animals. The substance is effective against adult worms and has no action on migratory larvae. Monthly dosing with cyanacethydrazide is recommended for preventive treatment. Toxic effects are seen by overdosing and these can be countered by using pyridoxine (vitamin B₆) as an antidote. K. R. Heath

FISHERIES HELMINTHOLOGY

Fresh-Water

1631—BOGDANOVA, E. A., 1958. [Buryatskaya nauchno-issledovatel'skaya veterinarnaya stantsiya, U.S.S.R.] [Seasonal changes in the parasite fauna of pike and bream in the Volga river.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 72–78. [In Russian.]

1632—BRGLEZ, J., 1961. "Prilog poznavanju parasitske faune potočne pastve i lipljana rijeke savinje i njenih pritoka." *Veterinarski Arhiv*, 31 (1/2), 8–10. [English & French summaries p. 10.] *Pseudochetosoma salmonicola* was recovered from the gall-bladder of 124 out of 186 *Salmo trutta f. fario* and from all 12 *Thymallus thymallus* examined. These are new host records and the parasite is also new for Yugoslavia. N. Jones

1633—FRASER, P. G., 1960. [Department of Zoology, University of Bristol, Bristol, England.] "The occurrence of *Diphyllobothrium* in trout, with special reference to an outbreak in the west of England." *Journal of Helminthology*, 34 (1/2), 59–72.

A review is given of the outbreaks of *Diphyllobothrium* in trout and related fishes. From a survey of the distribution of this cestode in Great Britain it has been found to occur in approximately half the areas from which trout have been examined and that three species infect trout and related species. An epidemic in brown and rainbow trout, caused by plerocercoids of *Diphyllobothrium* in a West of England reservoir caused heavy losses. It was found that the incidence of infection increased with the age of the host and that mortality appears to be related to the number of plerocercoids present. The absence of larvae in fry is discussed in relation to their feeding habits and the low incidence of infection in copepods. It is suggested that the infection is seasonal and that the possibility of a connection, through feeding habits, between the infection in the trout and that of the stickleback cannot be ignored.

H. H. Williams

1634—GOLIKOVA, M. N., 1960. [Ecological and parasitological study of the biocoenosis of some lakes in the Kaliningrad region. III. Parasite fauna of fish.] *Vestnik Leningradskogo Universiteta. Seriya Biologii*, 15 (9), 110–121. [In Russian: English summary p. 120.]

Eight species of fish (*Rutilus rutilus*, *Carassius carassius*, *Gobio gobio*, *Tinca tinca*, *Perca fluviatilis*, *Esox lucius*, *Anguilla anguilla* and *Pungitius pungitius*) from a lake on a poultry farm in the Kaliningrad region were examined. The parasites found included eight species of Monogenea, ten species of Digenea (seven of which were metacercariae), six species of Cestoda, six species of Nematoda, two species of Acanthocephala and one leech, *Hemiclepsis marginata*. All the parasites are listed with their hosts and the degree of infection. Among the cestodes were cysticerci of *Gryporhynchus pusillus*, parasitic in *Carassius carassius*, and cysticerci of

Dilepis unilateralis which was found in *P. pungitius* and *Carassius carassius*, and which is described. Specimens of this species had been mistakenly placed by Dubinin in 1952 (see **Parazitologicheskii Sbornik**, 14, 213–265) in *G. cheilancristrotus*. G. I. Pozniak

1635—HALE, P. A., 1959. [Department of Zoology, Queen's University, Belfast, Northern Ireland.] "A further record of *Hepatoxylon trichiuri* (Cestoda) in Ireland." **Irish Naturalists' Journal**, 13 (4), 100–101.

A parasitic worm found "lying near the ovary" of a salmon was sent to Hale for identification and proved to be the postlarva of *Hepatoxylon trichiura* Holten (= *Dibothriorhynchus grossum* Rudolphi), this being the third record of the parasite from Ireland. J. W. Smith

1636—HASAN, R. & QASIM, S. Z., 1960. [Zoologisches Institut der Muslim-Universität, Aligarh, India.] "The occurrence of *Pallisentis basiri* Farooqi (Acanthocephala) in the liver of *Trichogaster chuna* (Ham.)." **Zeitschrift für Parasitenkunde**, 20 (2), 152–156.

Hasan & Qasim report the occurrence of *Pallisentis basiri* Farooqi in the liver of *Trichogaster chuna*, an Indian fresh-water fish. This report is the first detailed account of an extra-intestinal infection by a member of the genus *Pallisentis*. The parasite in the liver was surrounded by a double-layered cyst wall. Although no information is available on life-histories in this genus it is postulated that *T. chuna* serves the role of "reservoir" or "carrier" host. Cyclops or daphnids may serve as intermediate hosts. W. L. Bullock

1637—KAŠTAK, V., 1957. [Helmintologický ústav, Košice, Czechoslovakia.] "Príspevok k poznaniu fauny cudzopasníkov rýb v inundačnom území lokality Senné." **Veterinársky časopis Bratislava**, 6 (2), 105–110. [French, German & Russian summaries p. 110.]

The helminths found in 11 species of fishes in a periodically flooded area in Slovakia are tabulated both under parasites and under hosts. N. Jones

1638—LISTRATOVA, V. N., 1958. [Stalingradski nauchno-issledovatel'ski institut epidemiologii, mikrobiologii i gigieny, U.S.S.R.] [Infection of fish in the lower Volga with plerocercoids of *Diphyllbothrium latum*.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 204–205. [In Russian.]

Examination of 366 specimens of ten species of fish in the lower Volga, revealed the presence of *Diphyllbothrium latum* plerocercoids in 27.2% of pike, 3.8% of pike-perch and 4% of perch. 74 specimens from Lake Sarpa, including pike-perch, gave negative results.

N. Jones

1639—LYAIMAN, E. M., 1958. [Moskovski tekhnicheskii institut ribnoi promishlennosti i khozyaistva, U.S.S.R.] [The influence of some helminths on the fish host.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 209–210. [In Russian.]

1640—MAKSIMOVA, E. A., 1958. [Chelyabinski pedagogicheskii institut, U.S.S.R.] [Infections with metacercariae of *Tylodelphys clavata* of the perch in relation to its age.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 216–218. [In Russian.]

Examination of 353 specimens of perch from less than one year old to eleven years old showed that metacercariae of *Tylodelphys clavata* were present in all age groups. The incidence was 27.5% in the youngest fish; it reached 100% and remained at this level after the age of six years. The highest mean degree of infection was amongst nine-year-old fish. N. Jones

1641—MEYER, F. P., 1958. [Department of Zoology & Entomology, Iowa State College, Ames, Iowa, U.S.A.] "Helminths of fishes from Trumbull Lake, Clay County, Iowa." **Proceedings of the Iowa Academy of Science**, 65, 477–516.

Meyer examined 1,841 fishes belonging to 13 different species and records the rates of helminth infestation as 58.6% in adult fish and 5.79% in fish less than a year old. The number of host species examined and the number and percentage infected with each species of parasite are tabulated. Another table gives a check list of the 16 trematodes, six cestodes, two nematodes and one acanthocephalan found and the number of species of fish infected with each. Notes

are given on each species of parasite. Immature specimens of *Phyllodistomum* sp. were recovered from the bile-ducts of *Catostomus c. commersoni* (the common white sucker). Infections of diplostomatid and neascus types of metacercariae were frequently very heavy; the same species often produced different reactions in different host species. Meyer suggests that heavy infections of these metacercariae greatly increase the mortality of host fish. Possible methods for reducing the degree of parasitism in Lake Trumbull are discussed. I. L. Owen

- 1642**—PAPERNA, I., 1960. [Department of Parasitology, The Hebrew University, Jerusalem.] [The influence of monogenetic trematodes on fish breeding economy.] **Bamidgeh. Israel**, 12 (2), 40–48. [In Hebrew: English summary pp. 54–55.]

In Israel monogenetic trematodes are a frequent cause of high mortality, especially among fry and fingerlings raised under artificial conditions. The appearance of some Monogenea is seasonal as their number is reduced to a minimum during the winter. Other species breed and infect fish throughout the year. The intensity of infection tends to reach a maximum in the spring when moderate temperatures, causing an increase in the oxygen content of the water, together with the emergence of the susceptible fry and fingerlings occur. In natural waters there is a balance between host and parasite so that infections are not usually serious. In artificial ponds high infestations may result from overcrowding, shallow stagnant water and consequent high temperatures. No fisheries operation should be initiated before considering the ecological aspects from a parasitological point of view. M. Beverley-Burton

- 1643**—ROMANOV, I. V., 1960. [Kafedra obshchei biologii, Gorkovski meditsinski institut imeni S. M. Kirova, U.S.S.R.] [Focus of diphyllbothriasis in the area of the Gorkiy water reservoir.] **Meditsinskaya Parazitologiya i Parazitarnie Bolezni. Moscow**, 29 (5), 611–614. [In Russian: English summary p. 614.]

Out of 500 fish, from the Gorkiy water reservoir, *Diphyllbothrium latum* plerocercoids were found in 100% of burbot, 92.2% of pike, 8.9% of perch and in 2% of ruff, while various species of Cyprinidae (roach, bream and others) were not infected. The incidence and degree of infection in pike were directly related to the age of the fish; plerocercoids were most frequent in the body-cavity and were most numerous in the mesentery of individual pike. N. Jones

- 1644**—SADKOVSKAYA, O. D., 1958. [Moskovski tekhnicheski institut ribnoi promishlennosti i khozyaistva, U.S.S.R.] [Change in the leucocyte formula of the blood of carp on infection with *Dactylogyrus solidus*.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 320–321. [In Russian.] The number of monocytes, polymorphonuclear agranulocytes and neutrophils was increased in carp as a result of infection with *Dactylogyrus solidus*. N. Jones

Marine

- 1645**—GUSEV, A. V., ZHUKOV, E. V. & STRELKOV, Y. A., 1959. [Zoologicheski institut, Akademii Nauk SSSR, Moskva, U.S.S.R.] [Parasitic infection of *Theregra chalcogramma* (Pallas), in relation to its economic use.] **Dokladi Akademii Nauk SSSR**, 125 (5), 1174–1176. [In Russian.] An examination of *Theregra chalcogramma* from four bays in eastern Russia as a possible food source for Russia, has shown that the two muscle parasites, *Porrocaecum* sp. and *Nybelinia surmemicola*, are practically absent from the Peter the Great Bay (July–October) and the Kronotskiy Bay (May), but are somewhat more frequent off the eastern coast of Kamchatka. G. I. Pozniak

- 1646**—PRAKASH, A. & ADAMS, J. R., 1960. [Department of Zoology, University of British Columbia, Vancouver, B.C., Canada.] "A histopathological study of the intestinal lesions induced by *Echinorhynchus lageniformis* (Acanthocephala-Echinorhynchidae) in the starry flounder." **Canadian Journal of Zoology**, 38 (5), 895–897.

Prakash & Adams studied the effects of *Echinorhynchus lageniformis* on the intestine of *Platichthys stellatus* by means of standard histopathological techniques. The female worms penetrated the intestinal wall more deeply than did the males. The embedded portion of the

parasite was surrounded by granulation tissue or, if the proboscis extended through the muscularis, by a polypoid protrusion. In all cases the reaction appeared to be chronic rather than acute.

W. L. Bullock

1647—RONALD, K., 1960. [Department of Entomology and Zoology, Ontario Agricultural College, Guelph, Ontario, Canada.] "The metazoan parasites of the Heterosomata of the Gulf of St. Lawrence. VI. Digenea." *Canadian Journal of Zoology*, **38** (5), 923-937.

Ronald found 22 species representing 17 genera of digenetic trematodes in a study of 560 specimens of Heterosomata (*Glyptocephalus cynoglossus*, *Hippoglossoides platessoides*, *Hippoglossus hippoglossus*, *Limanda ferruginea*, *Liopsetta putnami*, *Pseudopleuronectes americanus* and *Scophthalmus aquosus*) from the Gulf of St. Lawrence area. The parasites were as follows: *Aporocotyle simplex*, *Brachyphallus crenatus*, *Cryptocotyle lingua*, *Derogenes varicus*, *Genolinea laticauda*, *Gonocerca crassa*, *Hemiurus appendiculatus*, *H. communis*, *H. levinseni*, *Hemiurus* sp., *Lepidapedon rachion*, *Otodistomum veliporum*, *Peracreadium commune*, *Plagioporus varia*, *Podocotyle atomon*, *P. olssoni*, *Proisorhynchus squamatus*, *Steganoderma* (*Steganoderma*) *formosum*, *Stenakron vetustum*, *Stephanostomum baccatum*, *Steringophorus furciger*, *Steringotrema cluthense* and *S. pagelli*. Host distribution and parasitic incidence are given under each parasite, but there are no new records. A map of the Gulf of St. Lawrence area shows the distribution of each parasite and host. 31 references are given.

J. W. Smith

1648—WILLIAMS, H. H., 1960. [Zoology Department, University College, Cardiff, Wales.] "A list of parasitic worms, including 22 new records, from marine fishes caught off the British Isles." *Annals and Magazine of Natural History*. Series XIII, Year 1959, **2** (24), 705-715.

Williams lists 22 species of Monogenea, 19 of Digenea, one of Aspidogastrea, 38 of Cestoda and 4 species of Nematoda from 738 marine fishes (representing 46 species) caught off the British Isles. A map shows the areas from which the fishes were obtained. Seventeen helminths are new records for the British Isles. New host records are as follows: *Derogenes varicus* from *Urophycis blennoides*, *Gonocerca phycidis* from *U. blennoides* and from *Molva molva*, *Hemipera ovocaudata* from *M. molva*, *Lecithophyllum botryophoron* from *Osmerus eperlanus*, and *Spinitectus cristatus* from *Lophius piscatorius*.

J. W. Smith

NEMATOTOLOGY

Free-living Nematoda

1649—FLINT, E. A. & STOUT, J. D., 1960. [Department of Botany, University of Canterbury, Christchurch, New Zealand.] "Microbiology of some soils from Antarctica." [Correspondence.] *Nature*. London, **188** (4752), 767-768.

Nematodes (unnamed) were found in some samples of moss, algae and soil from the McMurdo Sound Region.

M. T. Franklin

1650—GERLACH, S. A., 1959. [Zoologisches Institut der Universität, Kiel, West Germany.] "Über das tropische Korallenriff als Lebensraum." *Verhandlung der Deutschen Zoologischen Gesellschaft*, **39**, 356-363.

Because of the meagre knowledge about tropical coral reefs as a marine biotope, Gerlach undertook the study of coral reefs in the Red Sea and Maldive Archipelago (Indian Ocean) on the Xarifa Expedition 1957/58. This is a preliminary report, awaiting publication of faunal lists. Most of the marine nematodes found had been previously reported from among algae in other localities.

R. W. Timm

Plant-Parasitic Nematoda

***1651**—BAINES, R. C., STOLZY, L. H., TAYLOR, O. C., SMALL, R. H. & GOODALL, G. E., 1958. "Nematode control on bearing trees." *California Citrograph*, **43** (9), 328-329.

- 1652—BRODIE, B. B., BRINKERHOFF, L. A. & STRUBLE, F. B., 1960. "Resistance to the root-knot nematode, *Meloidogyne incognita acrita*, in Upland cotton seedlings." **Phytopathology**, 50 (9), 673-677.

Larval inoculations with *Meloidogyne incognita* var. *acrita* were made in green-house tests on two varieties of *Gossypium hirsutum*, the resistant variety Auburn 56 and the susceptible Stoneville 62. No significant differences occurred between the numbers of larvae in the roots of the two varieties 48 hours after inoculation with 150, 450 or 900 larvae per ml. Sixteen days later the susceptible variety showed extensive galling of the inoculated roots with growth of laterals and some necrosis. The resistant variety showed extensive necrosis, no laterals and a few small swellings; new laterals were produced on the tap root. The nematodes developed slowly in the resistant plants and few reached maturity while in the susceptible plants the galling was associated with the presence of egg-laying females. The degree of galling appeared to be directly related to egg production. Thirty days after inoculation there was no evidence of disintegration of larvae in the roots of resistant plants. Five breeding lines showed the same evidence of resistance as Auburn 56 but had a higher percentage of susceptible individuals. The results indicate that resistance to root-knot in cotton can be determined 16 days after inoculation by the presence of necrotic roots and the absence of normal galling.

M. T. Franklin

- *1653—CAYROL, J. C., 1959. "Les anguillules, parasites de l'agriculture." **Agriculture. Paris**, 22 (209), 41-44.

- 1654—CAYROL, J. C., DENIZET, P., FARGEIX, A. & RITTER, M., 1960. [Laboratoire des Nématodes, Station de Zoologie Agricole d'Antibes, boulevard du cap. Antibes (A.-M.), France.] "Etudes préliminaires sur une maladie vermiculaire de l'ail provoquée par *Ditylenchus dipsaci* Kühn." **Phytiatrie-Phytopharmacie. Paris**, 9 (3), 181-190.

Cayrol *et al.* give an account of preliminary studies on severe infections of *Ditylenchus dipsaci* on *Allium sativum* (garlic) in the Puy-de-Dôme. Disease symptoms are described and the spread of infection discussed. Soil sampling in February, 1959 showed that a high proportion of the *D. dipsaci* was present at a depth of 10 cm. to 20 cm. Chemical treatments of the soil were made using D-D and DBE (dibromethane, 175 kg. active material in 300 litres) at 300 litres per hectare and Vapam (32.7% aqueous solution) at 300 and 1,000 litres per hectare. The DBE proved very phytotoxic to garlic. Vapam at the higher dosage gave very effective control of *D. dipsaci* but was less effective at the lower rate than D-D. The chemicals were applied in February at a depth of 15 cm. and soil temperature of 6°C. to 9°C. Planting took place about a month later. More information is required on the use of soil fumigants, their type, method, rate and time of application, the effect of cultural practices on *D. dipsaci* and its weed host range. A hot-water treatment similar to that used on shallots can probably be adapted for garlic.

D. J. Hooper

- 1655—CHAPMAN, R. A., 1960. "Population development of *Meloidogyne arenaria* in red clover." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 631.

- 1656—CHITWOOD, B. G. & BERGER, C., 1960. "Nemic parasites of coffee in Guatemala." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 631.

- 1657—CHITWOOD, B. G. & TOUNG, M. C., 1960. "*Meloidogyne* from Taiwan and New Delhi." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 631-632.

- 1658—COLBRAN, R. C., 1960. "Four nematode problems." **Journal of the Australian Institute of Agricultural Science**, 26 (4), 378.

- 1659—DAVIS, R. A. & JENKINS, W. R., 1960. "Effects of *Meloidogyne incognita acrita*, *M. incognita incognita*, and *M. hapla* on gardenia." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 633.

1660—DECKER, H., 1960. "Untersuchungen über die Nematodenfauna eines 'müden' Baumschulquartiers." *Wissenschaftliche Zeitschrift der Universität Rostock. Mathematisch-Naturwissenschaftliche Reihe*, 9 (2), 193–198.

Decker investigated the depth and seasonal distribution of nematodes in a "sick" fruit-tree nursery near Rostock, East Germany. The number of total nematodes was lower in December than in March, June and September, with *Pratylenchus penetrans*, the predominant plant nematode, forming 24% of the total in December and 39% in June. Total nematodes were fairly evenly distributed with depth throughout the top 32 cm. of soil, but very few *P. penetrans* were present in the top 4 cm., the numbers increasing with depth to a maximum between 16 cm. and 24 cm., where they formed some 60% of the total nematodes. Numbers of *P. penetrans* recovered from parasitized plants varied from 235 to 528 per gm. of roots. "Semi-parasitic" nematodes of many genera play the role of secondary parasites. R. D. Winslow

1661—DI EDUARDO, A. A., 1960. "Population variation of *Pratylenchus penetrans* and other nematodes associated with roots." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] *Phytopathology*, 50 (9), 633.

1662—DIKER, T., 1960. "Türkiyede şeker pancarı nematodunun (*Heterodera schachtii* Schmidt, 1871) yayılış durumu ve alınması lüzumlu tedbirler." *Seker. Ankara*, 9 (34), 9–14. [English summary p. 14.]

The distribution of *Heterodera schachtii* in Turkey is confined to an area 35 km. in length between Babaeski and Kirkareli. A list of other host plants in this area is given. A rotation scheme for the control of this eelworm is advocated. H. R. Wallace

1663—DONÀ DALLE ROSE, A., 1958. "Sulla lotta contro il nematode specifico della barbabietola da zucchero." *Agricoltura delle Venezie*, 12 (10), 553–556.

The importance of *Heterodera schachtii*, *Ditylenchus dipsaci* and *Meloidogyne* spp. as parasites of sugar-beet in Italy are briefly discussed. H. R. Wallace

1664—FERRARI, T. J., 1960. "Waarnemingen over de invloed van stikstofbemesting op schade door het haver cystenaaltje." *Landbouwwoorlichting*, 17 (5), 240–245.

Cereal-root eelworm was present in patches on fields in north Limburg used for nitrogen fertilization trials. Nematode damage was not always shown by oats on lightly infested plots. A small dose of nitrogen was sufficient to cancel nematode damage on lightly infested plots on which oats would have failed without it. Damage to oats was greater in spring on the wetter plots. In the presence of 2,000 to 6,000 larvae per 100 ml. soil 50 kg. nitrogen per hectare was insufficient to prevent damage. Under unfavourable conditions such as bad drainage this dose was insufficient to prevent damage by 700 to 1,000 larvae per 100 ml. The favourable effect of nitrogen is not due to suppression of nematodes but may be due to changes in the plants. M. T. Franklin

1665—FRENCH, N. & CAIRNS, R. S., 1960. [National Agricultural Advisory Service, Newcastle-upon-Tyne, England.] "A new spring oat variety resistant to stem and bulb eelworm." *Plant Pathology. London*, 9 (4), 129.

The spring oat variety Manod showed a high degree of resistance to *Ditylenchus dipsaci* in field trials carried out in Durham in 1959. Manod has a high yielding capacity, 98% that of Sun II and 14% better than Milford, the only other spring oat variety resistant to stem eelworm. Manod was recently reported showing resistance to stem eelworm in Wales [for abstract see Helm. Abs., 30, No. 1199]; it is also resistant to mildew and crown rust. D. J. Hooper

1666—GRAF, A., KELLER, E., LIECHTI, H. & SAVARY, A., 1960. [Eidgenössische Landwirtschaftliche Versuchsanstalt Zürich—Oerlikon, Switzerland.] "Das Rübenkopfälchen, vorläufiger Bericht." *Mitteilungen für die Schweizerische Landwirtschaft*, 8 (3), 33–45.

This is an extensive account of *Ditylenchus dipsaci* in beet; disease symptoms are described and illustrated by photographs. A map shows areas of infestation in Switzerland. Twenty-one varieties of sugar-beet and 12 varieties of fodder-beet were tested for their reaction to *D. dipsaci*

but none showed any marked resistance. Details are given of soil treatments with various nematicides but none of them gave very encouraging results. Some alternative crops and weed hosts of stem eelworm are given. D. J. Hooper

- 1667—HARRISON, M. B., 1960. "The reactions of three golden nematode populations to resistant and susceptible potato selections." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 638.
- 1668—HOLLIS, J. P. & MARTIN, W. J., 1960. "Greenhouse pathogenicity trials with nematode-infested soil." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 639–640.
- 1669—KIRKPATRICK, J. D., 1960. [Cornell University, U.S.A.] "A study of *Prunus cerasus* var. Montmorency in western New York: interrelations of rootstock, soil composition, root and soil populations of stylet-bearing nematodes, leaf composition, fruit quality, yield, and tree vigor." **Dissertation Abstracts**, 21 (2), 288–289.
- 1670—KONICEK, D. E. & JENSEN, H. J., 1961. "*Helicotylenchus nannus*, a spiral nematode associated with declining gardenias." [Abstract of paper presented at the 1960 Annual Meeting of the Pacific Division, American Phytopathological Society.] **Phytopathology**, 51 (1), 65.
- 1671—KOPVILLEM, K. G., 1958. [The study of eelworms of vegetables in the Kirov region.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 158–160. [In Russian.]
Neotylenchus sp., *Aphelenchoides parietanus*, *Aphelenchus avenae* and *Rhabditis* sp. were found in onion bulbs in September, as many as three of these species being present simultaneously in each infected bulb but not in potatoes, cucumbers, cabbages or garlic. No nematode infections were found during the spring. N. Jones
- 1672—KRILOV, P. S., 1958. [Gelmintologicheskaya laboratoriya AN SSSR.] [The influence of the mode of storage of potato tubers on the development of the eelworm fauna.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 176–180. [In Russian.]
 The composition of the eelworm fauna of stored potatoes differed from that of growing potatoes. Eusaprobionts (typical saprobionts) outnumbered other ecological groups. Their number even increased under unfavourable storage conditions and can serve as an indicator of putrefaction in the tubers. The presence of tylenchids which were mainly represented by plant-parasitic eelworms of non-specific pathogenic effect indicated the occurrence of bacterial and fungal diseases. N. Jones
- 1673—KRUSBERG, L. R., 1960. "Culturing, histopathology, and biochemistry of *Ditylenchus dipsaci* and *Aphelenchoides ritzema-bosi* on alfalfa tissues." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 643.
- 1674—LIDER, L. A., 1960. [Experiment Station, Davis, California.] "Vineyard trials in California with nematode-resistant grape rootstocks." **Hilgardia**, 30 (4), 123–152.
 Lider reviews the literature on vine rootstocks resistant to nematodes (*Meloidogyne* spp.). The parentage and properties of various resistant rootstocks are discussed. Detailed results are given of 19 root-stock trials carried out in the San Joaquin valley over a period of 22 years. The stocks tested were *Vitis solonis* × Othello 1613, Dogridge (*Vitis champini*), Salt Creek (*Vitis champini*), *V. solonis* × *V. riparia* 1616, *V. berlandieri* × *V. riparia* 5-A, *V. berlandieri* × *V. riparia* 420-A. The first three stocks named above gave the best results and some of them are capable of giving heavy yielding scions in poor, sandy, nematode-infested vineyard. D. J. Hooper
- 1675—LOWNSBERRY, B. F., 1961. "Factors affecting population levels of *Criconeimoides xenoplax*." **Phytopathology**, 51 (2), 101–103.
 In pots of sandy soil naturally infested with *Criconeimoides xenoplax*, Thomson seedless grape proved an excellent host of this species which increased from 2,000 to 60,000 nematodes per

5 in. pot in four months at 26°C., with smaller increases at 28°C., 21°C. and 18°C., but no increase at 13°C. Lovell and S-37 peach varieties were poor hosts causing little or no multiplication at the same range of temperatures. Controlling the nematodes by soil treatment with ethylenedibromide did not lead to better peach growth. This suggested that the nematodes, although observed feeding on the roots, were not causing appreciable injury to peach. Peach seedlings in infested soil grew better at pH 7 than at pH 5, but the nematodes apparently were not affected by this pH difference. Lownsbery suggests that soil moisture fluctuation is probably the cause of summer reductions in *C. xenoplax* numbers in some California peach orchards.

R. D. Winslow

1676—MARSHALL, G. M., 1960. [Official Seed Testing Station, Huntingdon Road, Cambridge, England.] "The incidence of certain seed-borne diseases in commercial seed samples. IV. Bunt of wheat, *Tilletia caries* (DC.) Tul. V. Earcockles of wheat, *Anguina tritici* (Stein.) Filipjev." **Annals of Applied Biology**, 48 (1), 34-38.

Marshall reviews the incidence of earcockles, *Anguina tritici*, in seed wheat samples in the United Kingdom from 1918 to 1957. The highest incidence was in 1921 when 9% of seed samples examined were infected. Since then the incidence has rapidly decreased and was nil in 1957. Improved seed cleaning processes are thought to be mainly responsible for practically eliminating this pest.

D. J. Hooper

1677—MASLENNIKOV, I. P., 1958. [Control of onion nematode.] **Sad i Ogorod. Moscow**, Year 1958, No. 5, pp. 27-28. [In Russian.]

1678—MIKHNOVA, E. S., 1958. [Litovskaya opitnaya stantsiya po koloradskomu zhuku, nematodam i raku kartofelya, U.S.S.R.] [A study of the susceptibility and resistance of some species of Solanaceae to *Heterodera rostochiensis* Woll.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 228-230. [In Russian.]

Experiments carried out under field conditions showed that tomatoes had slight infections with *Heterodera rostochiensis* and the cysts appeared later than in the case of potatoes. All the other plants tested, *Solanum melongena*, *Nicotiana rustica*, *Capsicum annuum*, *Physalis mexicana*, *Solanum nigrum*, *Hyoscyamus niger*, *H. niger* var. *albus*, *H. agrestis*, *Datura stramonium* and *D. inermis* were resistant to this infection.

N. Jones

1679—MINTON, N. A., CAIRNS, E. J. & SMITH, A. L., 1960. [Crops Research Division, ARS, U.S.D.A., Auburn, Alabama, U.S.A.] "Effect on root-knot nematode populations of resistant and susceptible cotton." **Phytopathology**, 50 (11), 784-787.

At monthly intervals from May to October counts were made of five species of nematode in the root zone of five species and varieties of cotton which had widely different degrees of susceptibility to root-knot nematodes. Larvae of *Meloidogyne incognita* var. *acrita* increased slowly in numbers under the more resistant cottons (a wild selection of *Gossypium barbadense*, a Mexican *G. hirsutum* and Auburn 56) and rapidly under Empire and Rowden varieties of *G. hirsutum*. By September the populations of root-knot larvae were at their peak and no plot differences existed. Population levels of *Trichodorus christiei*, *Pratylenchus brachyurus* and *Criconeoides ornatum* bore no relation to the root-knot susceptibility of the cotton variety around which they occurred. *Hoplolaimus tylenchiformis* populations were lowest under *G. barbadense*. Saprophagous nematodes were found in relatively high numbers throughout the season in all plots.

M. T. Franklin

1680—MORENO, A. F., 1958. "Algunos nemátodos parásitos que perjudican cultivos de interés económico." **Anales de la Sociedad Científica Argentina**, 166 (5/6), 115-121.

In this general article the author mentions some of the plant-parasitic nematodes found in Argentina. *Meloidogyne incognita* damages potatoes, tomatoes and chillies; *M. arenaria* is less wide-spread. *Ditylenchus dipsaci*, *Heterodera rostochiensis*, *H. schachtii*, *Tylenchulus semipenetrans* and *Radopholus similis* are also mentioned, with a few general remarks on control.

M. T. Franklin

1681—OEI HONG PENG, 1958. "Nematoda pada akar-akar." *Menara Perkebunan. Batavia*, **27** (9), 221-225. [English summary p. 221.]

The effect of size of mangold plants, measured by leaf-length, on root diffusate production was studied. It was concluded that there is a correlation between the rate of infection with *Heterodera schachtii* and the size of plant, and that older (larger?) plants are more heavily infected than younger (smaller?) ones. The article also includes a brief general discussion on the main types of plant-parasitic nematodes of which *Meloidogyne* spp. appear to be the most important pests in Indonesia. A. M. Shepherd

1682—OWENS, R. G. & NOVOTNY, H. M., 1960. "Physiological and biochemical studies on nematode galls." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] *Phytopathology*, **50** (9), 650.

1683—POWELL, N. T. & NUSBAUM, C. J., 1960. [Department of Plant Pathology, North Carolina State College, Raleigh, North Carolina, U.S.A.] "The black shank-root-knot complex in flue-cured tobacco." *Phytopathology*, **50** (12), 899-906.

By means of back-crossing, resistance to root-knot nematodes (*Meloidogyne incognita*) was incorporated into the tobacco varieties Dixie Bright 101 and Coker 139 which are resistant to the black shank fungus (*Phytophthora parasitica* var. *nicotianae*). Inoculation with the black shank and root-knot pathogens, either singly or combined, showed black shank to be more severe in the presence of root-knot than without it, both in the parent varieties and in root-knot susceptible segregates. Root-knot susceptible and root-knot resistant segregates did not differ in their susceptibility to black shank fungus, in the absence of root-knot nematodes. Histological studies showed that the black shank fungus was more extensive and more vigorous in the nematode galls than in non-galled tissues. Giant cells degenerated quickly when invaded by the fungus. Infection by root-knot nematodes appeared to predispose the plants to the black shank disease by providing, in the galls, a suitable substrate for fungus development. M. T. Franklin

1684—RIMKUTE, M., 1958. [Nauchno-issledovatel'skiy institut zemledeliya, Ministerstvo sel'skogo khozyaistva Litovskoi SSR.] [Some investigations into the potato-root eelworm and its control in Lithuania.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 287-292. [In Russian.]

Mass emergence of potato-root eelworm larvae was induced by the presence of potato rootlets or of water which had percolated through potato-growing soil. Two generations of cysts were obtained in the same year under laboratory conditions. Of 96 species of plants, belonging to 20 families, only the Solanaceae were susceptible to infection with this eelworm. Experimental infections of *Solanum laplatense*, *S. schicki*, *S. gibberulosum*, *S. schreiteri*, *S. acaule* and *S. demissum* gave positive results. Experiments involving over 100 varieties of potatoes and their hybrids with wild species of the family, showed that all of them were infected to different degrees. The formation of cysts on potato roots was prevented by application of 1,500 kg. of Forbiat per hectare. Cysts were not formed on potato roots and their incidence in the soil was considerably reduced when potatoes were planted in August instead of June or July. Planting potatoes three times in the same year and lifting immediately the larvae hatched, repeated in three successive years, reduced the incidence of viable cysts in the soil to 53.4%, 49.1% and 27.9% in the first, second and third years. Very good results were obtained when the planted potatoes, after sprouting were pulled out and replaced by other plants, combined with the application of preparation No. 23 (ethyl ether of dimethyldithiocarbamic acid).

N. Jones

1685—ROSS, J. P., 1960. [Department of Plant Pathology, North Carolina State College, Raleigh, North Carolina, U.S.A.] "*Heterodera trifolii*, a foliar pathogen of white clover." *Phytopathology*, **50** (11), 866-867.

In a green-house experiment Ross found immature females and mature brown cysts of *Heterodera trifolii* on both surfaces of the leaves of white clover. On staining a small leaf from near the crown larvae in all stages of development were observed; giant cells and hypertrophy occurred near the heads of mature females. It is suggested that cysts formed on clover leaves might be collected and disseminated with clover seed. M. T. Franklin

1686—RUEHLE, J. L. & SASSER, J. N., 1960. "The relationship of plant-parasitic nematodes to the growth of pines in out-plantings." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, **50** (9), 652.

1687—SCHIEBER, E. & SOSA, O. N., 1960. [Instituto Agropecuario Nacional, Guatemala, C.A.] "Nematodes on coffee in Guatemala." **Plant Disease Reporter**, **44** (9), 722-723.

Meloidogyne exigua and *Pratylenchus coffeae* were recovered from soil and root samples taken in coffee nurseries in Guatemala. Infested plants showed poor growth as seedlings and leaves turned yellow to brown. Some species of coffee are more resistant than others to these two plant-parasitic nematodes.
H. R. Wallace

***1688**—SCHMIDT, H. A., 1958. "Die Ergebnisse der Bodenuntersuchung auf Kartoffelnematoden-zysten für die Praxis auswerten." **Mitschurin Bewegung**, **7** (3), 109-113.

1689—SCHUSTER, M. L. & SULLIVAN, T., 1960. "Species differentiation of nematodes through host reaction in tissue culture. I. Comparisons of *Meloidogyne hapla*, *Meloidogyne incognita incognita*, and *Nacobbus batatiformis*." **Phytopathology**, **50** (12), 874-876.

Individual larvae of *Meloidogyne hapla*, *M. incognita* or *Nacobbus batatiformis* were placed 3 mm. from the tips of tomato roots growing under sterile conditions in agar medium. Consistent differences were observed in the symptoms caused by the three nematode species. In the presence of *M. incognita* root hairs were not formed on the gall, particularly when the gall was on or near the agar surface, and the epidermal cells appeared square in outline. With *M. hapla* root hair development was greater on the galls than on the adjacent root surface and the epidermal cells resembled those in *M. incognita* galls. Galls induced by *N. batatiformis* had no root hairs and the epidermal cells became almost spherical. This species also caused necrosis. All species caused galls by surface feeding as well as when they entered the roots. The technique used is suggested as a means of differentiating *Meloidogyne* species which would be supplementary to morphological differentiation.
M. T. Franklin

1690—STESSEL, G. J., 1960. "Association of *Rotylenchus robustus* with decline of nursery plants." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, **50** (9), 656.

1691—STREU, H. T., 1960. "Parasitism and pathogenicity of the ring nematode *Criconeimoides curvatum* on greenhouse carnation var. White Sim." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, **50** (9), 656.

1692—STURHAN, D., 1960. "Das Kohlzystenälchen (*Heterodera cruciferae* Franklin) in Bayern." **Pflanzenschutz. Munich**, **12** (10), 142-144.

A heavy infestation of *Heterodera cruciferae* was discovered in 1958 in a district near Munich where brassicas have been extensively grown for hundreds of years. Cyst counts varied from 13 to 458 per 100 c.c. of soil. Cysts, larvae, eggs and males are described in detail, with measurements: they correspond with published descriptions of the species. The status of *H. cruciferae* as a plant pest is given from published records.
M. T. Franklin

1693—TAYLOR, D. P., 1960. [University of Minnesota, U.S.A.] "Biology and host-parasite relationships of the spiral nematode, *Helicotylenchus microlobus*." **Dissertation Abstracts**, **21** (4), 721-722.

***1694**—THORNE, G., 1957. "The role of plant parasitic nematodes in establishing and maintaining orchards." **Report of the Michigan State Horticultural Society**, 87th (1957), 97-100.

1695—TIKTIN, N. V., 1958. [Minskaya pitnaya stantsiya po raku kartofela, U.S.S.R.] [Control of the potato-root eelworm by the development of resistant varieties.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 371-375. [In Russian.]

Of 136 varieties of 40 wild and cultivated potato species *Solanum ballsii* was the most resistant to *Heterodera rostochiensis*. Resistance to this infection was also observed in *Solanum catarrhum*, while *S. andigenum* showed a very wide range of degrees of resistance. Good results were obtained by hybridization of the two former species with cultivated potatoes. N. Jones

- 1696**—USTINOV, A. A. & ZINOVEV, V. G., 1958. [Nauchno-issledovatel'skiy institut biologii, Kharkovski universitet, U.S.S.R.] [On some biochemical changes in the tissues of plants infected by eelworms.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 376–379. [In Russian.]
The quantity of non-protein nitrogen, ammonia, water and monosaccharides was greater in the galls caused by *Meloidogyne* sp. on cucumber and tomato roots than in the healthy parts of the roots. The quantity of protein nitrogen did not decrease and in the galls of tomato roots increased somewhat. In parts of potato tubers, at the climax of infection with *Ditylenchus destructor*, the quantity of ammonia, water and monosaccharides increased. At later stages of the infection the quantity of all the substances decreased with ensuing cellular necrosis. N. Jones
- 1697**—USTINOV, A. A. & ZINOVEV, V. G., 1960. [Nematode disease of clover.] **Zashchita Rastenii ot Vreditel'ei i Boleznei**, Year 1960, No. 8, pp. 54–55. [In Russian.]
Ustinov & Zinovev give the general aspects of parasitism of clover by *Ditylenchus dipsaci*, *Heterodera trifolii* and *Meloidogyne* sp. N. Jones
- 1698**—VAN GUNDY, S. D., 1961. "The influence of *Tylenchulus semipenetrans* on growth of grape cuttings." [Abstract of paper presented at the 1960 Annual Meeting of the Pacific Division, American Phytopathological Society.] **Phytopathology**, **51** (1), 67.
- 1699**—WARD, C. H., 1960. "Dagger nematodes associated with forage crops in New York." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, **50** (9), 658.
- 1700**—WHITEHEAD, A. G. & KARIUKI, L., 1960. "Root-knot nematode surveys of cultivated areas in East Africa." **East African Agricultural and Forestry Journal**, **26** (2), 87–91.
The first of a series of intensive root-knot nematode surveys in heavily cultivated areas of East Africa in a wide range of ecological zones, was carried out in Kikuyu Division of Kiambu District, Kenya. The 50 square mile area selected lay between 6,600 ft. and 7,000 ft. above sea-level and the soils were dark red friable clays. *Meloidogyne javanica*, *M. incognita* var. *acrita*, *M. hapla* and *M. sp. ?acrona* were found, of which the two former were common. Tables and a map show the distribution of *Meloidogyne* spp. over the range of cultivated and uncultivated host plants sampled and throughout the sampled area. Included are 26 apparently new host records for *Meloidogyne* spp. Males of the two common root-knot nematode species were abundant in roots of *Leucas mollis*. "Root multispecies", defined as the occurrence of more than one species of *Meloidogyne* on a single root system was a common phenomenon throughout the region. Several combinations of species were encountered. A. G. Whitehead
- 1701**—WU, L. Y., 1960. [Nematology Section, Entomology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Canada.] "Comparative study of *Ditylenchus destructor* Thorne, 1945 (Nematoda: Tylenchidae), from potato, bulbous iris, and dahlia, with a discussion of de Man's ratios." **Canadian Journal of Zoology**, **38** (6), 1175–1187.
Wu transferred *Ditylenchus* from potato to dahlia and carrot and from bulbous iris to dahlia and potato. Examination of the nematodes from their original hosts and after being transferred showed that the host may influence the total length, width, number and arrangement of sex cells, length of oesophagus, length of spear and tail shape. It is stated that the *Ditylenchus* from potato, iris and dahlia freely interbreed. [Evidence is given of limited interbreeding as a result of introducing females or larvae from one host to males of another in potato tissue.] In the absence of prominent morphological differences in the various populations studied together with the fact that they interbreed, Wu concludes that they are all *D. destructor*. Using measurements of *D. destructor*, Wu discusses the validity of the ratios *a*, *b* and *c* of de Man and the indication of the vulva as a percentage of the body length from the anterior end (*V*%). It is concluded that only the *c* value for males and "*V*%" have some statistical support from the data given. [But see also the paper by Goodey, 1952, giving the influence of the host on *D. destructor* dimensions; for abstract see Helm. Abs., **21**, No. 331c.] D. J. Hooper

- 1702**—ZUCKERMAN, B. M. & COUGHLIN, J. W., 1960. [Department of Entomology and Plant Pathology, University of Massachusetts, U.S.A.] "Nematodes associated with some crop plants in Massachusetts." **Bulletin. Massachusetts Agricultural Experiment Station**, No. 521, 18 pp. In 355 samples of soil and roots from 160 cranberry bogs, Zuckerman & Coughlin found *Tylenchus* spp. in 73% of the bogs, *Hemicycliophora* in 72.5%, *Dorylaimus* in 63% and *Trichodorus* in 42%. Most prominent of the remaining spear nematodes were *Tetylenchus*, *Tylencholaimus*, *Aphelenchoides*, *Helicotylenchus* and *Tylenchorhynchus*. In contrast, *Meloidogyne*, *Pratylenchus* and *Rotylenchus* were very poorly represented and *Paratylenchus* apparently absent. Two uncommon genera recorded are *Atylenchus* and *Ecphyadophora*. The spear nematodes found associated with 11 other crops are recorded. The ecological and possible economic significance of the findings are discussed, particularly with reference to *Hemicycliophora*.
R. D. Winslow

Insect-Parasitic Nematoda

- 1703**—COUTURIER, A., 1960. [Institut National de la Recherche agronomique, Station de Zoologie agricole, Colmar, France.] "Observations sur la dysharmonie de taille chez quelques Mermithidae (Nématodes)." **Comptes Rendus des Séances de l'Académie des Sciences**, Paris, 251 (3), 436–438.
- Measurements of three mermithids, *Pseudomermis hagmeieri*, *Tunicamermis melolonthae* and *Hexamermis* sp. showed that nematode diameter equalled a constant times the length raised to a power. The power was less than one, and different for each species. H. E. Welch

Control

- 1704**—ABDULLAEV, S. G., SHIPINOVA, S. I. & TRESKOVA, V. S., 1960. [Control of root-knot nematodes in the district of Apsharon.] **Zashchita Rastenii ot Vreditel'ei i Boleznei**, Year 1960, No. 8, pp. 28–29. [In Russian.]

From studies of the root-knot nematode under the conditions in Apsharon, it is concluded that: (i) of agricultural control measures only crop rotation with non-susceptible crops for not less than four to five years was effective against larvae in the soil; (ii) of the nematocides used only the preparation No. 23 (ethyl ether of dimethyl-dithiocarbamic acid) and chloropicrin were effective; (iii) sodium salicylate, ammonium nitrate and potassium chloride inhibited the reproduction of the female root-knot nematodes without harming the plants. N. Jones

- 1705**—BELOKURSKAYA, V. I., 1958. [Karantinnaya laboratoriya Litovskoi SSR.] [Control of the potato-root eelworm.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 59–62. [In Russian.]

In Lithuania the area covered by *Heterodera rostochiensis* has increased considerably during the past ten years. In control experiments on fields with various degrees of infection (20 to 1,200 viable cysts per kg. of soil), crop rotations with cabbage, cucumber and garlic were carried out for three years. This reduced the viable cysts by 71.8% and where the land was kept under bare fallow by 76%. At the same time the degree of infection of the control plots increased by 28%. Good results were obtained from chemical treatments with consecutive two-year rotations. Thus dichlorethane at 1.5 kg. per sq.m. reduced the infection by 100% and 1.5 tons per hectare of preparation No. 23 by 65% to 93%. However, it reappeared as soon as potatoes were planted again but more slowly after dichlorethane than after preparation No. 23. Nevertheless potato yields were still much higher than those from the control plots. N. Jones

- 1706**—CAMPBELL, L. & COURTNEY, W. D., 1960. [Washington Experiment Station and Crops Research Division, ARS., U.S.D.A., Puyallup, Washington, U.S.A.] "Effect of high-temperature water vapor on soil organisms." **Plant Disease Reporter**, 44 (10), 804–805.

Treatment of pulverized and agitated soil with water vapour, super-heated to 800–850°F., gave good control of soil nematodes. H. R. Wallace

1707—COOPER, W. E. & SASSER, J. N., 1960. "Recent developments in sting nematode control on peanuts." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 632.

*1708—DAVIDSON, J. H., 1957. "Preplant soil fumigation treatments for improving growth of fruit trees." **Report of the Michigan State Horticultural Society**, 87th (1957), pp. 93-97.

1709—DECKER, H., 1960. "Die endoparasitischen Wurzelnematoden der Gattung *Pratylenchus* als einheimische Pflanzenschädlinge." **Wissenschaftliche Zeitschrift der Universität Rostock. Mathematisch-Naturwissenschaftliche Reihe**, 9 (1), 27-34.

In this review of *Pratylenchus* spp. as crop pests, Decker deals with the symptoms, effects and diagnosis of parasitism by *Pratylenchus*, morphology and biology of the parasites, and control. Except in a few special instances, chemical control is uneconomic and crop rotation is recommended, with the best possible growing conditions for attacked crops.

R. D. Winslow

1710—EDWARDS, C. A. & DENNIS, E. B., 1960. [Rothamsted Experimental Station, Harpenden, Herts., U.K.] "Some effects of aldrin and DDT on the soil fauna of arable land." [Correspondence.] **Nature. London**, 188 (4752), 767.

Populations of plant-parasitic nematodes were not affected by soil dressings of the insecticides aldrin, applied at the rate of 3 cwt. of 1.25% aldrin dust per acre, and D.D.T. at 2 cwt. of 5% dust per acre. The soil was sampled at intervals of two to three months to a depth of 6 inches and the nematodes extracted by Baermann funnel.

M. T. Franklin

1711—EFREMENKO, V. P., 1958. [Litovskaya opitnaya stantsiya po koloradskomu zhuku, nematodam i raku kartofelya, U.S.S.R.] [*Heterodera rostochiensis* and its control.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 130-134. [In Russian.]

The preparations D-D and DDIB (mixture of dichloroisobutane, dichloroisobutylene and polychlorides), applied at a rate of 400 gm. per sq. m., considerably reduced the incidence of *Heterodera rostochiensis* in potatoes when planted under experimental conditions one month later. Good results were also obtained with the preparation No. 23 (ethyl ether of dimethyldithiocarbamic acid). However, complete disinfection of soil under laboratory and field conditions was only achieved with 160 gm. to 248 gm. of chloropicrin per sq.m. Crop rotations reduced the number of viable cysts by 28.4% to 59.4% after one growing season. This reduction was greatest in the case of leguminous crops. In the absence of potatoes 10.2% of viable cysts remained after five years. When potatoes were reintroduced after an absence of two to three years the resulting infection of soil was much greater than if they had been grown continuously. In such cases preparation No. 23 is recommended as it was found to have a pronounced action both against free larvae and against those within wet cysts.

N. Jones

1712—EPPS, J. M., 1960. "Evaluation of crops rotation and soil fumigation for controlling the soybean cyst nematode." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 635.

1713—JENSEN, H. J. & KONICEK, D. E., 1960. "Effects of certain phosphorodithioate compounds upon populations of *Pratylenchus penetrans*." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 640.

1714—MANKAU, R., 1960. "The use of nematode-trapping fungi to control root-knot nematodes." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 645.

1715—NÖTZEL, H. & WAGNER, E., 1959. [Institut für Pflanzenzüchtung Bernberg, Deutsche Akademie der Landwirtschaftswissenschaften, Berlin.] "Bekämpfung des Rüben-nematoden (*Heterodera schachtii*) durch Fruchtfolgemaßnahmen." **Deutsche Landwirtschaft**, 10 (10), 493-496.

The authors review previous work by German authors on chemical, physical and biological control of beet eelworm, concluding that rotational methods are the most useful up to the

present. The effect on population level of various rotations was studied in a field experiment. The populations were estimated as the number of "full cysts" per 50 gm. sample of air-dried soil. Maize, chicory and onion are referred to as "enemy plants", although the rate of fall of cysts with contents caused by these crops was not significantly different to that in fallow plots. The authors claim that the inclusion of maize in rotations assists in controlling beet eelworm.

A. M. Shepherd

1716—ROSS, J. P., 1960. "Soybean cyst nematode control by crop rotation." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 652.

1717—SHER, S. A., 1960. "Chemical control of plant-parasitic nematodes in plant roots." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 654.

1718—STESSEL, G. J., 1960. "Effects of nematocides on *Pratylenchus pratensis* and alfalfa yields." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 656.

1719—SVESHNIKOVA, N. M., 1960. [Method for removing nematodes from garlic.] **Zashchita Rastenii ot Vreditel'ei i Boleznei**, Year 1960, No. 7, pp. 34–35. [In Russian.]
When garlic cloves were soaked in water under laboratory conditions 70% to 100% of stem nematodes were eliminated during the first day. Under field conditions the cloves were soaked in water for three days and then immersed in 1:20 formalin solution for one to two minutes. The treated cloves were then planted and the plants produced appeared healthy, only four out of 46 being infected, whereas all the controls were infected.

N. Jones

1720—TURLIGINA, E. S., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR, Moskva, U.S.S.R.] [A new method for controlling the root-knot nematode.] **Priroda**, Moscow, Year 1958, No. 5, pp. 95–96. [In Russian.]

The use of chemicals in low concentrations to prevent further development rather than to kill the nematodes is a comparatively new method. Cucumbers in their vegetative stage and infected with root-knot were watered three times at four to five-day intervals (the first five to seven days after infection) with 0.25% potassium thiocyanate, 0.25% sodium salicylate or 1% ammonium nitrate. A single application of either of the first two substances was well tolerated and the number of nematode eggs in egg sacs was reduced to 77 to 127 and 46 to 400 respectively as compared with 890 to 1,015 in controls, and only small numbers of galls (3 mm. in size) were present on the lateral roots. Further waterings were harmful to the plants. Ammonium nitrate was harmless even in three applications and was similarly effective. Turligina suggests that this "therapeutic" method in combination with the sterilization of soil will prove an efficient control of root-knot.

G. I. Pozniak

1721—WALKER, J. T., 1960. "The effect of hot water at different temperatures on larvae of various species of *Meloidogyne*." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 658.

1722—WILLIAMSON, C. E. & HARRISON, M. B., 1960. "Nematode control on roses with root dip treatments." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 659.

Miscellaneous

1723—BIRCHFIELD, W., 1960. "Growth studies of a *Catenaria* sp. infecting nematodes." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 629.

1724—GOFFART, H., 1960. "Rückblick über die Entwicklung des Instituts für Hackfruchtkrankheiten und Nematodenforschung." *Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft*, No. 99, pp. 5-14.

1725—KLEIJBURG, P., 1959. [Plantenziektenkundige Dienst, Wageningen.] "Untersuchungsdienst für Nematodenschädigungen." *Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft*, No. 97, pp. 193-194.

Kleijburg describes a service provided for farmers and horticulturalists in the Netherlands for investigating the nematodes present in soil samples. A charge of ten guilders is made for each sample. The service is attached to Bedrijfslaboratorium voor Grond- en Gewasonderzoek, Oosterbeek, but is at present carried out under the auspices of Plantenziektenkundige Dienst, Wageningen. Nematodes which have been considered so far include *Heterodera göttingiana*, *H. trifolii*, *H. avenae*, *H. carotae*, *Ditylenchus dipsaci*, *Rotylenchus robusta*, *Pratylenchus penetrans* and other *Pratylenchus* spp., and *Paratylenchus* spp. As a result of this service, which it is hoped will be expanded, advice can be given to growers on suitable crop rotations.

A. M. Shepherd

1726—KRALL, E. L., 1958. [Institut zoologii i botaniki AN Estonskoi SSR i kafedra zoologii, Tartuski gosudarstvenni universitet, U.S.S.R.] [Plant-parasitic and soil nematodes in the Estonian S.S.R.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 171-172. [In Russian.]

In a brief historical account of plant-parasitic and soil nematodes in Estonia, Krall mentions his own work in potato fields, where at least 43 species of soil nematodes were found. Of these 21 were definitely identified and are listed. The greatest number of eelworms was found at a depth of 10 cm. to 20 cm.

N. Jones

1727—MANKAU, R., 1961. "Antagonisms to nematode-trapping fungi in soil." [Abstract of paper presented at the 1960 Annual Meeting of the Pacific Division, American Phytopathological Society.] *Phytopathology*, 51 (1), 66.

1728—TIMM, R. W. & AMEEN, M., 1960. [Notre Dame College, Dacca 2, East Pakistan.] "Nematodes associated with commercial crops in East Pakistan." *Agriculture Pakistan*, 11 (3), 355-363. In a one-year survey 15 genera of plant-parasitic nematodes were found. The most abundant and wide-spread were *Hoplolaimus* and *Meloidogyne*. Also occurring in large populations were *Xiphinema*, *Ditylenchus*, *Aphelenchoides*, *Tylenchorhynchus*, *Rotylenchus*, *Criconemoides* and *Radopholus*. Occurring in lesser numbers were *Pratylenchus*, *Tylenchulus*, *Helicotylenchus*, *Hemicylichophora*, *Longidorus* and *Rotylenchulus*. 54 genera of free-living nematodes encountered are listed.

R. W. Timm

1729—WEISCHER, B., 1960. "Der Einfluss des Bodens auf die Verbreitung pflanzenparasitärer Nematoden in Rebanlagen." *Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft*, No. 99, pp. 51-59.

Weischer studied the influence of soil type, in 14 wine-growing districts of Germany, on the distribution of nematodes of the genera *Paratylenchus*, *Helicotylenchus*, *Criconemoides*, *Pratylenchus*, *Pratylenchoides*, *Xiphinema* and *Macrotrophurus*. *Paratylenchus* was most wide-spread, being found in all vineyards and in greater numbers than any other genus. Four species were distinguished; in some cases they were strictly confined to soil types, in others two or three species were found together. *Helicotylenchus* and *Criconemoides* were each found in 13 of the 14 districts, the latter avoiding heavy soil. *Pratylenchoides* was found in a heavy soil but was absent from adjoining sandy soil. *Macrotrophurus* was found in only one place, in a heavy clay soil. The only species of *Pratylenchus* found was *P. thornei*; it occurred in all soil types but only in valleys and not on slopes where temperature and moisture were variable.

M. T. Franklin

TAXONOMY

Monogenea

- 1730—ERGENSE, R., 1961. [Biologisches Institut der Tschsl. Akademie d. Wissenschaften, Parasitologie, Prag, Czechoslovakia.] "Zwei weitere Befunde der *Gyrodactylus*-Art (Monogeneoidea) aus der Tschechoslowakei." *Věstník Československé Zoologické Společnosti*, 25 (1), 25-27. [Czech summary p. 27.]

Two Monogeneoidea are described from fish from the river Topla. *Gyrodactylus salaris* from *Salmo trutta*, which is new for Czechoslovakia, and *G. malmbergi* n.sp. from the gills of *Barbus meridionalis petenyi*. A table compares the characters of *G. malmbergi*, *G. nemachili* and *G. lefua*. The new species is nearest to *G. nemachili* but differs from it in the size of the chitinous parts of the haptor and in the U-shaped dorsal supporting plate.

G. I. Pozniak

- 1731—MALMBERG, G., 1957. "Om förekomsten av *Gyrodactylus* på svenska fiskar." *Skrifter utgivna av Södra Sveriges Fiskeriförening*, Year 1956, pp. 19-76. [English summary pp. 66-67.]

A study of the excretory system of living specimens of *Gyrodactylus* under a phase-contrast microscope has enabled Malmberg to differentiate 15 new species and five subspecies parasitic on fishes caught in the fresh, brackish and marine waters of Sweden. That closely related fishes were infected by closely related parasites has also enabled him to aggregate the various forms into five species-complexes, each having the same type of excretory system; each type differs mainly in the different number and arrangement of the flame bulbs in the opisthaptor, the presence or absence of propulsive flame cells in the main canals, the different locations on the junction point for the anterior and posterior system in each half of the body, and the presence or absence of a contractile bladder with each excretory pore. Line drawings illustrate these differences. (i) In the *G. wagneri*-complex the pharynx has eight long processes and the cirrus a single circle of minute spines; this complex contains the following: *G. w. aphyae* n.subsp. from *Phoxinus phoxinus*; *G. w. scardinii* n.subsp. from *Leuciscus erythrophthalmus* and *Alburnus alburnus*; *G. w. tincae* n.subsp. from *Tinca tinca*; *G. w. cernuae* n.subsp. and *G. longiradix* n.sp. from *Acerina cernua*; *G. w. lucii* n.subsp. from *Esox lucius*; *G. salaris* n.sp. from *Salmo salar* and *G. lavareti* n.sp. from *Coregonus lavaretus*. Slight differences in the size and thickness of the anchors and in the outline of the ventral bar membrane are also cited under each species. Malmberg considers that all the species described since 1860 as identical with *G. wagneri* (Wagner, 1860) must be given new names. (ii) In the *G. callariatis*-complex the pharynx has eight minute processes, the cirrus has a single circle of minute spines, the dorsal bar is complicated, the ventral bar processes are large and directed anterolaterally and the membrane is grooved; this group contains *G. callariatis* n.sp. from *Gadus callarias* and *G. aculeati* n.sp. from *Gasterosteus aculeatus*. (iii) In the *G. elegans*-complex the pharynx has eight minute processes but the cirrus has several circles of minute spines, the dorsal bar is short and wide and the ventral bar membrane is long; this group contains *G. elegans* (Nordmann, 1832, syn. *G. parvicopula* Bikhovski, 1933), *G. decorus* n.sp. from *Leuciscus erythrophthalmus*, and *G. phoxini* n.sp. and *G. magnificus* n.sp. (which has eight long pharyngeal processes) from *Phoxinus phoxinus*. (iv) The *G. flesi*-complex has eight long processes to the pharynx and a single circle of minute spines on the cirrus, thick anchors and the ventral bar is wide with a grooved membrane; it contains *G. flesi* n.sp. and *G. robustus* n.sp. both from *Pleuronectes flesus*. (v) In the *G. harengi*-complex the pharynx has eight minute processes, the cirrus has a single circle of minute spines, and the ventral bar lacks visible processes; it contains only one species, *G. harengi* n.sp. from *Clupea harengus membras*. Three species which cannot be placed in a species complex at present are *G. rarus* Wagner, 1909 from *Gasterosteus pungitius*, *G. minimus* n.sp. and *G. laevis* n.sp. both from *Phoxinus phoxinus*.

R. T. Leiper

- 1732—REICHENBACH-KLINKE, H. H., 1959. [Bayerische Biologische Versuchsanstalt, München 22, Veterinärstr. 13, West Germany.] "Zwei neue Tetraonchinen aus Südostasien (Trematoda: Monogenea: Dactylogyridae)." *Zeitschrift für Parasitenkunde*, 19 (4), 364-367.

Two new species of Tetraonchinae are described and figured. *Daireosoma chaetodontis* n.sp. from the gills of *Chaetodon collaris*, differs from the three known species of the genus in its occurrence on a marine host. There is no narrowing of the last third of the body and the hooks

are stouter and broader. *Parancyrocephaloides leiocassis* n.sp. from the gills of *Leiocassis siamensis* differs from *P. daicoci* in having a much smaller and more slender body. The hooks are longer and do not have the marked cleavage at their basal end. The crossbar is not curved.

R. T. Leiper

- 1733**—SPASSKI, A. A. & ROITMAN, V. A., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR, Moscow.] [*Salmonchus skrjabini* n.g., n.sp. (Monogenoidea), a new parasite of Salmonidae.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 254–259. [In Russian.]

Reviewing *Tetraonchus* the authors observed two morphological and ecological trends among the species. Species parasitic in Esocidae and Thymallidae in which the plate of the supporting apparatus spirally surrounds the chitinous copulatory tube, an additional supporting plate at the proximal end of the tube is absent, the connecting bar of the opisthaptor is butterfly-shaped and rudimentary parts of a second connecting bar are absent, are left in *Tetraonchus*. They are *T. monenteron* (type), *T. borealis* and *T. rauschi*. Species parasitic in Salmonidae in which the plate does not coil around the copulatory tube, the connecting bar of the opisthaptor is straight or horseshoe-shaped and fan-shaped rudiments of a second connecting bar are present, are put into *Salmonchus* n.g. They are *S. huchonis* n.comb. (type), *S. alaskensis* n.comb., *S. arcticus* n.comb., *S. lenoki* n.comb., *S. variabilis* n.comb. and a new species from a salmonid fish from the Tuva region, *S. skrjabini* n.sp. [Although the text mentions that two new species of this genus had been found, only one is named and described.]

G. I. Pozniak

Digenea

- 1734**—ABLASOV, N. A. & IKSANOV, K. I., 1958. [Institut zoologii i parazitologii, Akademiya nauk Kirgizskoi SSR, U.S.S.R.] [Trematode fauna of fish-eating birds in Kirgizia.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 15–22. [In Russian.]

Twenty-nine trematode species are recorded from 155 fish-eating birds (15 species) in Kirgizia. These include two new species from *Larus ridibundus* on Lake Issyk-Kul, which are described and figured. *Orchipedium kirgisicum* n.sp. differs from the only near species, *O. armenicum*, by the smaller body (length 5.35 mm., maximum width 1.07 mm.), oral sucker (0.25 mm. × 0.31 mm.), ventral sucker (0.50 mm. × 0.44 mm.), pharynx (0.23 mm. long) and ovary (0.21 mm. × 0.16 mm.), and the larger testes (0.16 to 0.21 mm. × 0.11 to 0.12 mm.) and eggs (0.71 mm. × 0.42 mm.). There are only about 17 testes, the oesophagus is absent and the vitellaria are broken centrally. *Echinostoma koisarensis* n.sp. differs from *E. chasma*, *E. echinocephalum* and *E. govindum* principally in the smaller size of the body (length 1.07 mm. to 1.3 mm., maximum width 0.25 mm. to 0.33 mm.), and organs, and the number (36) and size of cephalic spines (dorsal and ventral spines 0.033 mm. to 0.035 mm. long, lateral spines 0.037 mm.).

G. I. Pozniak

- 1735**—AGARWAL, S. M., 1959. [Department of Zoology, M. M. V., Jabalpur, India.] “Studies on a new species of the genus *Echinoparyphium* (Dietz, 1909) (Trematoda: Echinostomatidae).” **Bulletin de la Société Zoologique de France**, **84** (5/6), 322–329.

Echinoparyphium dollfusi n.sp. from *Anhinga melanogaster* is described. This new species bears 34 head spines and has vitelline follicles which extend from the level of the anterior border of the anterior testis almost to the posterior extremity of the worm. Doubt is expressed on the validity of the genus *Neacanthoparyphium* Yamaguti, 1958.

M. Beverley-Burton

- 1736**—AGARWAL, S. M., 1960. [Department of Zoology, M.M.V., Jabalpur, India.] “Studies on the morphology, systematics and life history of *Clinostomum giganticum* n.sp. (Trematoda: Clinostomatidae).” **Indian Journal of Helminthology**, Year 1959, **11** (1/2), 75–115.

A brief historical review of the genus *Clinostomum* is given followed by a description of adult and larval stages of *C. giganticum* n.sp. The new species is closest to *C. leptophallum* but differs from it in the form of the utero-duct, the absence of cuticular spines, the extent of the vitellaria and the intestinal caeca ending blindly without an anus. *Bubulcus ibis* and *Ardeola*

grayi were found to be final hosts both naturally and experimentally; *Lymnaea acuminata* and *L. luteola* were used experimentally as the first intermediate host and *Ophicephalus punctatus* as the second intermediate host. A key to the species of the genus *Clinostomum*, based on adult anatomy and also a table of identification of metacercarial forms are included.

M. Beverley-Burton

1737—BELOUS, E. V., 1958. [Validity of *Crepidostomum ussuriensis* Layman, 1930.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 69–71. [In Russian.]

Belous disagrees that *Crepidostomum ussuriensis* is a synonym of *C. farionis*. Basing his work on material from various fish from the Maritime Territory, he describes *C. ussuriensis* and gives as the chief differential characters: (i) the position and measurements of the cirrus pouch, which in *C. ussuriensis* reaches below the ventral sucker but in *C. farionis* hardly reaches its centre, and (ii) the vitellaria, which are better developed in *C. ussuriensis*, reach the oral sucker and meet almost medially in front of the ventral sucker, while in *C. farionis* they do not tend to meet medially and do not extend to the pharynx. The second intermediate host of *C. ussuriensis* was found to be *Gammarus* sp. The encysted metacercariae were whitish, spherical and 0.8 mm. in diameter. The extracted metacercariae did not differ morphologically from young flukes present in the fish. *C. farionis* cysts are dark, pear-shaped and half the size; the first and second intermediate hosts are *Pisidium amnicum* (rarely *Sphaerium corneum*) and larval *Ephemera donica*. Belous further suggests that the Canadian species, with its second intermediate host *G. pulex*, will probably prove to be nearer to the Far Eastern *C. ussuriensis* than the European *C. farionis*.
G. I. Pozniak

1738—BEVERLEY-BURTON, M., 1960. [Department of Zoology, University College of Rhodesia and Nyasaland, Salisbury, Southern Rhodesia.] "Some trematodes from otters in Southern Rhodesia including a new strigeid, *Prudhoella rhodesiensis* n.gen., n.sp." **Proceedings of the Helminthological Society of Washington**, 27 (2), 129–134.

Prudhoella rhodesiensis n.g., n.sp. is described from a large number of specimens recovered from *Lutra* (*Hydricis*) *maculicollis maculicollis* and *Aonyx capensis capensis*. The validity of the subfamily Alariinae is discussed as *Prudhoella*, a parasite of mammals, has vitellaria which extend from the posterior half of the fore-body, throughout the "holdfast" to the testicular region of the hind-body. Redescriptions are given of *Cynodiplostomum namuri* Kuntz & Chandler, 1956 and *Baschkirovitrema incrassatum* (Diesing, 1850) Skryabin, 1944.

M. Beverley-Burton

1739—BRENES, R. R. & ARROYO, G., 1960. [Departamento de Parasitología, Facultad de Microbiología, Universidad de Costa Rica.] "Helminths of the República de Costa Rica XVII. Description of *Ochetosoma bravoii* n.sp. and redescription of *Glypthelminis palmipedis* (Lutz, 1928) Travassos, 1930." **Revista de Biología Tropical. Universidad de Costa Rica**, 8 (2), 239–245. [English summary p. 242.]

Ochetosoma bravoii n.sp. collected from the oesophagus of an unidentified snake at Escazú, Costa Rica, is described and figured. The characters differentiating it from other members of the genus are listed. *Glypthelminis palmipedis* (Lutz, 1928) Travassos, 1930 is now reported in *Bufo marinus* from Costa Rica and is redescribed and illustrated.
R. T. Leiper

1740—BRENES, R. R., ARROYO SANCHE, G. & DELGADO FLORES, E., 1959. [Laboratorio de Helminología, Instituto de Biología, U.N.A.M., Costa Rica.] "Helminths of the República de Costa Rica XI. Sobre la validez del género *Langeronia* Caballero y Bravo, 1949 (Trematoda: Lecithodendriidae) y hallazgo de *Ochetosoma miladelarocai* Caballero y Vogelsang, 1947." **Revista de Biología Tropical. Universidad de Costa Rica**, 7 (1), 81–87. [English summary p. 85.]

The genus *Langeronia* Caballero & Bravo, which Yamaguti (1958) has treated as synonymous with *Loxogenes* Stafford, 1915 is considered to be a valid genus containing the species *Langeronia macrocirra*, *L. liberum* (Seno, 1908) n.comb. and *L. okavei* (Koga, 1954) n.comb. The genus *Loxogenes* now contains only *L. arcanum* and *L. provitellaria*. *Bufo m. marinus* and *Rana warchewitschii* are new hosts for *Langeronia macrocirra*, and *Drymobius m. margaritifera* for *Ochetosoma miladelarocai*. Both flukes are now reported from Costa Rica for the first time.
R. T. Leiper

- 1741—BRENES, R. R., ARROYO, G. & JIMÉNEZ-QUIRÓS, O., 1960. [Departamento de Parasitología, Facultad de Microbiología, Universidad de Costa Rica.] "Helminths of the Republic of Costa Rica XVIII. A new species of *Euryhelms* (Trematoda: Heterophyidae), parasite of *Mustela frenata costaricensis*." *Revista de Biología Tropical. Universidad de Costa Rica*, 8 (2), 247–251. [English summary p. 250.]

Discrepancies in the diagnostic characters of the genus *Euryhelms* Poche, 1926 published by various authors are discussed and revised to include *E. squamula*, *E. monorchis*, *E. pacificus* and *E. pyriformis*. Its geographical range is extended by the finding of *E. costaricensis* n.sp., which is figured and described from *Mustela frenata costaricensis* in Costa Rica. It is differentiated from *E. pacificus* by the size of the suckers, the size of the prepharynx and the position of the pharynx, the shape of the ovary, the form and position of the vitelline glands and the size and shape of the gonotyl. It differs from the three other members of the genus in body size and shape and in combinations of various morphological characters. R. T. Leiper

- 1742—BRENES, R. R., ARROYO, G. & MONTERO-GEI, F., 1960. [Facultad de Farmacia de la Universidad de Costa Rica.] "Helminths of the Republic of Costa Rica XVI. *Parallopharynx gonzalezi* n.sp. (Trematoda: Plagiorchiidae)." *Revista de Biología Tropical. Universidad de Costa Rica*, 8 (2), 233–237. [English summary p. 235.]

Parallopharynx gonzalezi n.sp. from the intestine of *Basileiscus vittatus* and *Ctenosaura similis similis* in Costa Rica is described and figured. It is differentiated from *P. arctus*, the type and only other species in the genus, by its size, the ratio of the oral and ventral suckers, the ovoid form and the size and position of the testes and ovary, and the arrangement of the vitellaria. R. T. Leiper

- 1743—BRENES, R. R. & JIMÉNEZ-QUIRÓS, O., 1959. [Departamento de Parasitología, Facultad de Microbiología, Universidad de Costa Rica.] "Helminths of the Republic of Costa Rica XII. *Zonorchis costaricensis* n.sp. (Trematoda, Dicrocoeliidae) parasite of biliary vias of *Gymnostinops montezuma* (Icteridae)." *Revista de Biología Tropical. Universidad de Costa Rica*, 7 (1), 125–129. [English summary p. 127.]

Zonorchis costaricensis n.sp. from the bile-ducts of *Gymnostinops montezuma* is reported from Costa Rica. This is the first time that a species of *Zonorchis* has been found in the Icteridae and the first time that the genus *Zonorchis* has been recognized in the Central American area north of Panama. The characteristic features of the new species are the presence of fine papillae on the cuticle, especially anteriorly, and the covering of the whole body with spinous plates regularly arranged but more frequent and more easily visible on the ventral surface. The greater distance between the anterior edge of the acetabulum and the anterior end of the body and the greater size of cirrus sac and Mehlis' gland are additional distinguishing features. R. T. Leiper

- 1744—CABALLERO y C., E., 1959. [Laboratorio de Helminthología, Escuela Nacional de Ciencias Biológicas, I.P.N., México.] "Consideraciones en torno a la familia Xenoperidae Poche, 1925 (Trematoda, Digenea Carus, 1863)." *Revista de Biología Tropical. Universidad de Costa Rica*, 7 (1), 57–61. [English summary p. 60.]

In 1952 Dollfus showed that *Xenopera* Nicoll, 1915 was synonymous with *Proctoeces* described by Odhner in 1911 and considered by him to be an aberrant genus of Fellodistomatidae. Skryabin & Koval created for it a new subfamily Proctoecinae within this family but Caballero considers that these authors should have replaced the name Xenoperidae Poche, 1925 by a new family name. He now suggests the name Proctoecidae nom.nov. derived from the type genus *Proctoeces* and includes in the Proctoecinae the genera *Proctoeces*, *Gauhatiiana*, *Mesolecitha*, *Symmetrovessicula* and *Urorchis*. R. T. Leiper

- 1745—COIL, W. H. & KUNTZ, R. E., 1960. "Three new genera of trematodes from Pacific sea serpents, *Laticauda colubrina* and *L. semifasciata*." *Proceedings of the Helminthological Society of Washington*, 27 (2), 145–150.

Ophiotrematoides orientalis n.g., n.sp. is described from *Laticauda colubrina*. *Ophiotrematoides* belongs to the Acanthocolpidae and is most similar to the genus *Tormopsolus* Poche, 1926 from which it differs by having an aspinose metraterm and cirrus, diagonal testes, a compact rather than elongate body and possibly a different host group. A second new form, *Ateuchocephala marinus* n.g., n.sp. from *L. semifasciata* is also proposed. *Ateuchocephala*, an acanthostomid,

is compared with the genera *Caimanicola* Freitas & Lent, 1938, and *Acanthostomum* Looss, 1899, both reported from reptilian hosts. *Ateuchocephala* is most similar to *Acanthostomum* but differs from it in the absence of an anterior crown of spines, cuticular spines and prepharynx, in the caeca opening to the exterior at some distance from the posterior end, in the uterus extending into the extra-caecal field and in the bifurcation of the excretory bladder in the region of the intestinal bifurcation. The third form described in this paper is *Pulmovermis cyanovitellosus* n.g., n.sp. from *L. semifasciata*. *Pulmovermis*, a hemiurid, resembles *Hysterolecitha* Linton, 1910, which is assigned to the subfamily Hysterolecithinae. *Pulmovermis* differs from existing hemiurid genera by a very elongate body shape, by the testes being tandem in the posterior half of the body, in the absence of an oesophagus, and in the position of the ventral sucker close to the oral sucker. A short discussion is given on the host-parasite relationship of the families mentioned.

M. Beverley-Burton

- 1746**—DELYAMURE, S. L. & KLEINENBERG, S. E., 1958. [Krimski pedagogicheski institut, U.S.S.R.] [A study of the helminth fauna of the white whale (*Delphinapterus leucas*) in the south-eastern part of the Barents and Kara Seas.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 123–126. [In Russian.]

The following are recorded from 49 white whales from the Kara Sea: *Leucasiella arctica* n.sp., *Odhneriella seymouri*, *Diphyllbothrium lanceolatum* (deformed specimens), *Anisakis kükenthalii*, *Otophocaenurus oserskoi*, *Stenurus arctomarinus*, *Terranova decipiens*, plerocercoids of *Pyramicocephalus phocorum* and larval or immature *Anisakis* sp., *Contracaecum* sp. and *Porrocaecum* sp. No acanthocephalan was found. *D. lanceolatum*, *T. decipiens* and all larval forms are new host records. The new species, which was present in the rectum of 16.3% of the whales, is differentiated from *L. mironovi* by the large deeply lobed testes, the larger ovary (0.20 mm. to 0.43 mm. in diameter) and eggs (0.095 mm. to 0.106 mm. \times 0.049 mm. to 0.060 mm.) and the vitellaria which reach to the ventral sucker; and from the second species in the genus, *L. subtila*, by the smaller body (6.8 mm. to 8.0 mm.), pharynx (0.35 mm. to 0.55 mm.), prepharynx (0.30 mm. to 0.35 mm.) and genital bursa (1.13 mm. to 1.72 mm.), by the extent of the vitellaria and by the presence of body spines.

G. I. Pozniak

- 1747**—DUBOIS, G., 1960. "Redécouverte de *Scaphanocephalus expansus* (Creplin 1842) (Trematoda: Heterophyidae)." **Annales de Parasitologie Humaine et Comparée**, 35 (3), 426–427.

Dubois describes three specimens of *Scaphanocephalus expansus* from *Pandion h. haliaetus* taken at Sète (France), and briefly reviews its distribution and taxonomic status. E. I. Sillman

- 1748**—ERASMUS, D. A., 1960. [Department of Zoology, University College, Cardiff, South Wales.] "A new furcocercaria, *Cercaria roathensis*, from British freshwaters." **Journal of Helminthology**, 34 (1/2), 85–92.

Cercaria roathensis n.sp. from *Planorbis carinatus* collected from Roath Park Lake, Cardiff, differs from *Cercaria Petersen I* and *Cercaria Frederiksborgensis* in body length, tail stem length and furca length which are 132 μ , 152 μ and 170 μ respectively, in the dimensions, 32 $\mu \times$ 24 μ and 25 $\mu \times$ 25 μ of the oral and ventral suckers, in having six to seven pairs of caudal bodies, a pair of non-pigmented eye spots and four rows of spines on the ventral sucker. The flame cell formula is $2[(1+1)+(1+1+1+(1))]=12$.

H. H. Williams

- 1749**—ETGES, F. J., 1960. [Department of Biological Sciences, University of Cincinnati, Ohio, U.S.A.] "The status of the genera *Acanthatrium* Faust, 1919, and *Prosthodendrium* Dollfus, 1931 (Trematoda: Lecithodendriidae)." **Journal of Parasitology**, 46 (4), 525–527.

Etges shows that Yamaguti's (1958) action in placing all members of the *Acanthatrium-Prosthodendrium* complex in one genus is well founded, but his choice of *Prosthodendrium* Dollfus, 1931 over *Acanthatrium* Faust, 1919 is untenable since the latter has priority. Accordingly, Etges lists the species which he transfers from *Prosthodendrium* to *Acanthatrium* in the

subgenera *Prosthodendrium* Dollfus, 1937 and *Acanthatrium* Skarbilovich, 1948. The generic diagnosis given by Yamaguti (1958) for *Prosthodendrium* serves as well for the genus *Acanthatrium*.
E. I. Sillman

1750—FAIN, A., 1960. [Laboratoire de Zoologie medicale, Institut de Medecine tropical, Anvers, Belgium.] "Nouveaux schistosomes d'oiseaux du genre *Gigantobilharzia* Odhner." **Annales Parasitologie Humaine et Comparée**, **35** (3), 292–304.

Fain describes *Gigantobilharzia adami* n.sp. and *G. nettapi* n.sp. from the mesenteric veins of *Nettapus auritus*, and *G. plectropteri* n.sp. from the portal veins of *Plectropterus gambensis*, taken at Astrida (Ruanda-Urundi). Only males of the first two species were recovered. The new species are differentiated from each other and the ten other species in the genus *Gigantobilharzia* by a combination of characters set out in a key to the males of 11 of the 12 described species. *G. sturniae* Tanabe, 1948, is omitted because it is poorly described. E. I. Sillman

1751—FREITAS, J. F. TEIXEIRA DE, 1959. [Instituto Oswaldo Cruz, Rio de Janeiro, Brazil.] "Nota sobre *Tanaisia inopina* Freitas, 1951 (Trematoda, Eucotylidae)." **Atas da Sociedade de Biologia do Rio de Janeiro**, **3** (6), 2–4.

Freitas redescribes and figures *Tanaisia inopina* Freitas, 1951, from five specimens collected from the kidney of *Sterna* sp. The 27 species in the genus *Tanaisia* are listed. *Paratanaisia* n.g. is described; it differs from *Tanaisia* chiefly in that the vitellaria extend in front of the level of the ovary. Three species, formerly in *Tanaisia*, are transferred to the new genus: *P. bragai* (Santos, 1934) n.comb., designated as the type species; *P. confusa* (Freitas, 1951) n.comb.; and *P. robusta* (Freitas, 1951) n.comb. *Tanaisia* sp. of Freitas, 1951, is also placed in the new genus.
E. I. Sillman

1752—FREITAS, J. F. TEIXEIRA DE & DOBBIN, Jr., J. E., 1960. "Nota prévia sobre novo trematódeo do gênero *Paralecithodendrium* Odhner, 1911." **Atas da Sociedade de Biologia do Rio de Janeiro**, **4** (4), 59–60.

Paralecithodendrium brachycolon n.sp. is described from the small intestine of *Molossus major crassicaudatus* in Pernambuco, Brazil. Its acetabulum is not smaller than the oral sucker, a feature it shares with three other known members of the genus. Of these, the new species may be distinguished from *P. anticum* by its ovary which is not pre-testicular and by the pre-acetabular position of its testes, from *P. aranhai* by its body which is longer than wide, by its very short caeca, by its false cirrus sac which is globular and voluminous and by its ovary which is not clearly trilobed, and from *P. skrjabini* by its smooth cuticle and by the position of its ovary and testes. No figures illustrate the description. W. M. Fitzsimmons

1753—GORYACHEV, P. P., 1958. [Chelyabinski meditsinski institut, U.S.S.R.] [Some characteristics of the development of *Opisthorchis felineus* (Rivolta, 1884) in the intermediate host under West Siberian conditions.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 119–122. [In Russian.]

In West Siberia, the development in the laboratory of *Opisthorchis felineus* larvae in *Bithynia leachi*, either bred in the laboratory or collected locally, lasted nearly a year. As Vogel (1929, 1932, 1937) in his experiment with *B. leachi* showed that in Central Europe the larval development was completed in two months, Goryachev looks upon the West Siberian form as a geographical variation of the species and names it *O. felineus winogradovi* [n.subsp.].

G. I. Pozniak

1754—ISHIDA, H., 1960. [Department of Pathology, Osaka Medical College, Osaka, Japan.] [Studies on the dermatitis-producing *Cercaria mieensis* n.sp. in man. 1. On the eggs of an avian schistosome newly found in *Querquedula crecca crecca* in Nagashima, Mie Prefecture.] **Japanese Journal of Parasitology**, **9** (6), 717–723. [In Japanese: English summary p. 723.]

Ishida found eggs of an avian schistosome in the intestinal mucosa of a teal, *Querquedula crecca crecca*, from Mie Prefecture. From his observations, he concluded that they were the eggs of a new species of *Trichobilharzia*. [See also abstracts No. 1302 and No. 1755.]

Y. Yamao

1755—ISHIDA, H., 1960. [Department of Pathology, Osaka Medical College, Osaka, Japan.] [Studies on the dermatitis-producing *Cercaria mieensis* n.sp. in man. II. On *Cercaria mieensis* n.sp. developed from eggs of an avian schistosomae.] **Japanese Journal of Parasitology**, 9 (6), 724–729. [In Japanese: English summary p. 729.]

A fresh-water snail, *Lymnaea japonica*, was experimentally infected with the miracidia hatched from the eggs of *Trichobilharzia* n.sp. newly found in the teal. Cercariae were obtained from the snails 72 to 84 days after the infection. These are named *Cercaria mieensis* n.sp. after the locality and are described and figured. [See also abstracts Nos. 1302 & 1754 above.]

Y. Yamao

1756—JAISWAL, G. P. & VASUDEV, T., 1960. [Department of Zoology, College of Science, Osmania University, Hyderabad, A. P., India.] “Studies on the avian trematodes, belonging to the genus *Eumegacetes* Looss 1900.” **Zeitschrift für Parasitenkunde**, 20 (2), 175–190.

Jaiswal & Vasudev discuss the systematic position of the genus *Eumegacetes* and reaffirm its retention within the subfamily Eumegacetinae Mehra, 1935 (Lecithodendriidae). An emended diagnosis of the subfamily is given with an annotated list of 13 species of *Eumegacetes* heretofore described. Five new species of *Eumegacetes* from Hyderabad are figured and described: (i) *E. indicus* n.sp., from the rectum of *Temenuchus pagodarum*, which possesses a small body associated with each testis termed an epididymoid; (ii) *E. longicirratu* n.sp., from the cloaca of *Hirundo smithii filifera*; (iii) *E. hirundiosus* n.sp., from the intestine of *H. rustica rustica*; (iv) *E. megaceta* n.sp., from the intestine of *Halcyon fusca fusca*; and (v) *E. hyderabadensis* n.sp., from the intestine of *Lanius excubitor lahora*. These are distinguished from each other, and other described species of the genus by combinations of characters. Finally a key to the 18 known species of *Eumegacetes*, including the new species, is given.

E. I. Sillman

1757—JIMÉNEZ-QUIRÓS, O. & ARROYO, G., 1960. [Departamento de Parasitología, Facultad de Microbiología, Universidad de Costa Rica, Costa Rica.] “Helminths of the Republic of Costa Rica. XIV. Redescription of *Lutztrema obliquum* Travassos, 1941, y descripción de *Zonorchis macroovarius* n.sp.” **Revista de Biología Tropical. Universidad de Costa Rica**, 8 (1), 53–61. [English summary p. 57.]

The occurrence of *Lutztrema obliquum* (Travassos, 1917) in Costa Rica is reported for the first time in *Gymnostinops montezuma*. *Zonorchis macroovarius* n.sp. is described from the bile-ducts of *Pteroglossus t. torquatus* in El Silencio, Tilarán, Costa Rica. It differs from *Z. angrense* in having a reniform-shaped ovary, in that Mehlis' gland lies in the right lateral field and the vitelline glands run from the intratesticular field to end considerably in front of the terminal portion of the caeca.

R. T. Leiper

1758—KASIMOV, G. B., VAIDOVA, S. M. & FEIZULLAEV, N. A., 1958. [Institut zoologii, Akademii nauk Azerbaidzhanskoi SSR, U.S.S.R.] [A new trematode from *Bubulcus ibis*.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 145–147. [In Russian.]

Nephrostomum skryabini n.sp., from the intestine of *Bubulcus ibis* in Azerbaidzhan, differs from the four species in the genus by having cuticular spines along the whole body. It is nearest to *N. ramosum* and *N. bicolanum* (which Prudhoe, 1954, considers to be synonymous but Skryabin & Bashkirova in Skryabin, 1956, disagree with him) but differs from these in the shape of the testes, which are entire and oval rather than faintly lobed.

G. I. Pozniak

1759—KHAN, D., 1960. “An undescribed species of echinostome cercaria.” [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (4), 289.

1760—KUPRIYANOVA-SHAKHMATOVA, R. A., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR, Moscow.] [Experimental proof of the identity of *Notocotylus attenuatus* Rudolphi, 1809 and *N. thienemanni* L. & U. Szidat, 1933.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 185–187. [In Russian.]

In 1933 Szidat & Szidat had shown that *Notocotylus* cercariae, *Cercaria ephemera*, from the mollusc *Coretus corneus* were those of a new species *N. thienemanni* and described the larger cercariae from *Galba palustris* as *Cercaria vaga* belonging to *N. attenuatus*. To prove the probable identity of these species, the present author infected a duckling with *Notocotylus*

cercariae from *G. palustris* and a duckling and gosling with those from *Coretus corneus*. All the adults obtained were *N. attenuatus*. Comparing these with the description of *N. thienemanni* she found that the *N. thienemanni* were smaller and had fewer cuticular glands. On the basis of the experiments, on the fact that *N. attenuatus* from different geographical zones and hosts is known to show considerable variation particularly in the number of the glands, and that *N. thienemanni* is unknown from birds in Russia, she concludes that *N. thienemanni* is a synonym of *N. attenuatus* and *Cercaria vaga* of *C. ephamera*.
G. I. Pozniak

1761—KUROCHKIN, Y. V., 1958. [Astrakhanski gosudarstvenni zapovednik, U.S.S.R.] [The helminth fauna of *Phoca caspica* during its breeding season.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 188–194. [In Russian.]

Examination of 35 *Phoca caspica* from the Caspian Sea area showed the following parasites: two intestinal trematodes *Mesorchis advena* n.comb. (for *Pseudechinostoma advena*, as the specimens now found had a ring of spines on the collar) and *Ciureana badamschini* n.sp., immature *Diphyllobothrium* sp., *Anisakis schupakovi*, *Eustrongyloides excisus*, Nematoda gen.sp. larva (as described by Kurochkin & Zablotski, 1958) and *Corynosoma strumosum*. The new species, *Ciureana badamschini*, differs from the other two species in the genus, *C. quinqueangularis* and *C. cryptocotyloides*, by the median position of the ovary and by being generally smaller but with larger eggs.
G. I. Pozniak

1762—LEONOV, V. A., 1958. [New trematodes of ciconid birds.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 200–203. [In Russian.]

Three new trematodes are described and figured from birds from the Black Sea coast. *Echinochasmus* (*E.*) *militaris* n.sp., from *Ardea cinerea* and *Egretta alba*, is nearest to *Echinochasmus* (*E.*) *bagulai* but differs from it by the powerful cuticular armature, the lobed testes, and the large size of the ventral sucker (0.31 mm. to 0.39 mm.) and collar spines (the two marginal spines 0.049 mm., the remaining twenty-two 0.055 mm. to 0.056 mm.) although the body measurements are identical. *Metamorchis nycticoraxis* n.sp., from *Nycticorax nycticorax*, differs from the four species in the genus by the following: from *M. intermedius* and *M. manitobensis* by its small size (1.95 mm. to 2.15 mm.), the more posterior position of the testes and by the simple intestinal caeca; from *M. skrjabini* by the more posterior extent of the caeca and the vitellaria which stretch from the bifurcation of the caeca to the anterior edge of the ovary; and from *M. canadensis*, in which the body size is similar, by the testes and the ventral sucker being twice as large. *Renicola sudaricovi* n.sp., from *A. cinerea* and *Egretta garzetta*, is differentiated from the other four species in the subgenus *Renicola* with a tandem arrangement of testes, by the elongated lobed ovary, a ventral sucker considerably smaller than the testes and the gut caeca which terminate at the lower edge of the posterior testis.
G. I. Pozniak

1763—MAÑÉ-GARZÓN, F., 1958. “Un nouveau trématode des batraciens de l'Uruguay: *Catadiscus corderoi* n.sp.” **Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo**, 4 (78), 1–3.

A new amphistome, *Catadiscus corderoi* n.sp. is described from *Pseudis meridionalis*. *C. corderoi* is separated from other species of the genus *Catadiscus* as it is relatively large and has uterine coils which extend in front of the intestinal bifurcation and comparatively small eggs (less than 70 μ long).
M. Beverley-Burton

1764—MITSKEVICH, V. Y., 1958. [Leningradski veterinarni institut, U.S.S.R.] [*Cotylophoron skrjabini* n.sp. from *Rangifer tarandi*.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 231–235. [In Russian.]

Skryabin in 1931 recorded a new *Cotylophoron* from *Rangifer tarandi* and reported it to be described by Gorbunov (1931) as *C. skrjabini*. This latter work, however, was never published and the species, according to the Rules of the International Commission on Zoological Nomenclature, cannot be accepted as valid. Consequently, Mitskevich now describes and figures

from his own material, *C. skrjabini* n.sp. As the key shows, the new species is differentiated from the four species known in the genus by the following characters: the body is wide and 7.4 mm. to 11.7 mm. long; the ratio of the ventral sucker diameter to the body length is 1:4.4 and that of the oral sucker length to the genital sucker diameter is 1:1.9; the ventral sucker is posterior and subterminal; the testes are diagonally placed; and the eggs measure 0.147 mm. to 0.155 mm. \times 0.084 mm. to 0.1 mm. G. I. Pozniak

1765—MOROZOV, F. N., 1958. [Gorkovski gosudarstvenni pedagogicheskii institut, U.S.S.R.] [The question of the presence of an anus in digenetic trematodes.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 239–242. [In Russian.]

Morozov shows from the literature that a number of digenetic trematodes do possess anal openings (the first report of one was by Leiper in 1908 in *Balfouria monogama*) and groups them into four types giving examples of each, i.e. (i) caeca open into excretory vesicle, (ii) caeca join posteriorly to form an anal canal which opens ventrally, (iii) caeca open to the exterior laterally not reaching the end of the body, and (iv) caeca open at the posterior end of the body by separate terminal anal pores. Within this last group Morozov describes and figures *Jubilarium skrjabini* n.g., n.sp. from the intestine of a duck from Kamchatka. The new form is a typical heterophyid in the shape of the body, the presence of a small genital sinus and the large seminal vesicle which is divided into two parts, but is placed in a new subfamily Jubilariinae n.subf. on the presence of the two anal pores and the characteristic shape of the vitellaria. These are compact and in two groups, each of which is composed of four large follicles; the two groups lie near one another immediately behind the testes. G. I. Pozniak

1766—MOZGOVOI, A. A. & MISHENINA, 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR, Moscow.] [*Prosthogonimus macroskrjabini* n.sp. from domestic fowls in the Yakut A.S.S.R.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 236–238. [In Russian.]

Prosthogonimus macroskrjabini n.sp. is described and figured from two specimens found in a hen's egg in the Yakut A.S.S.R. It differs from all species of *Prosthogonimus* from fowls by the extent of the vitellaria which terminate before reaching the testes and from all except *P. longusmorbificans* by the large body (length 17.3 mm., maximum width 6.3 mm.). From *P. longusmorbificans* it differs by having diffuse rather than racemose vitelline glands. G. I. Pozniak

1767—MURHAR, B. M., 1959. [Department of Zoology, M.M. College of Science, Nagpur, India.] "A new trematode from the Indian kite, *Milvus govinda* Sykes." **Bulletin of the Zoological Society, College of Science, Nagpur, 2**, 37–40.

Opisthorchis milvusensis n.sp. from the liver of the pariah kite, *Milvus govinda*, is differentiated by its smooth skin from *O. piscicola*, *O. giddhis*, *O. ophidiarum*, *O. pedicellata* and *O. gomtii*. The length of the body (9 mm.), the presence of a prepharynx, the extra-caecal position of the vitellaria (which are densely follicular extending along the sides of the body) and the unequal, slightly lobed, obliquely placed testes distinguish it from *O. ahingi*, *O. longissimus*, *O. simulans*, *O. asiaticus* and *O. obsequens*. It differs in body length and in the presence of a prepharynx from *O. tenuicollis* and *O. geminus*, and from *O. entzi* in the shape and length of the body, the position of the vitellaria and the arrangement of the ovary and testes. A key is provided to distinguish the 13 species now known in Indian hosts. R. T. Leiper

1768—MURHAR, B. M., 1960. [Department of Zoology, M.M. College of Science, Nagpur, India.] "On a new trematode, *Prostotocus dorsoporus* (subfamily Prostotocinae Yamaguti 1958) from common Indian frog, *Rana tigrina* Daud." **Bulletin of the Zoological Society, College of Science, Nagpur, 3**, 67–72.

Murhar describes and figures *Prostotocus dorsoporus* n.sp. from the duodenum of *Rana tigrina* at Nagpur, India. The new species differs from all other species of the genus in having the opening of the genital pore on the dorsal surface near the left body margin and from the various

species by combinations of morphological characters. The author discusses the structure and arrangement of the vitelline follicles and ducts in *P. himalayai* and *P. dorsoporus*. A key to the species of the genus *Prostocis* is given. J. W. Smith

1769—ODENING, K., 1960. [Deutsche Akademie der Wissenschaften zu Berlin, Zoologische Forschungsinstitut im Berliner Tierpark, Berlin-Friedrichsfelde, Schloss-str. 1, Germany.] "Zur Grosseinteilung der digenitischen Trematoden." *Zeitschrift für Parasitenkunde*, **20** (2), 170–174.

Odening proposes that the type of germinal sac in which cercariae develop be the basis for the separation of the subclass Digenea into two major groups. Thus he erects two new subclasses, Sporocystoidei and Redioidei, in which cercariae develop in sporocysts or rediae, respectively. This scheme is to be compared with that of LaRue [for abstract see Helm. Abs., **26**, No. 95h], in which the major dichotomy is based on the nature of the development of the excretory bladder. The two schemes are set out in tabular form for easy comparison. The Redioidei include one superorder, Rediida n.superordo, containing three orders: (i) Allocreadiida n.ordo, with one suborder Allocreadiata Skryabin, Petrov & Koval in Skryabin, 1958, and the superfamilies Allocreadioidea *sensu stricto* and Lepocreadioidea; (ii) Opisthorchiida LaRue, 1957, with the suborders Opisthorchiata LaRue, 1957, Hemiurata (Poche, 1926) and perhaps the Didymozoa (Poche, 1926); and (iii) Fasciolida Szidat, 1939, with the suborders Echinostomata (Szidat, 1939), Notocotylata (Poche, 1926), Paramphistomatata (Poche, 1926) and perhaps the Clinostomatata n.subordo; and provisionally two additional suborders, Azygiata LaRue, 1957, and Cyclocoelata LaRue, 1957, which do not seem to fit in any of the above three orders. The Sporocystoidei are divided into two superorders, the Gasterostomatida n.superordo, corresponding to Odhner's (1905) concept, "Gasterostomata"; and the Prosostomatida char. et nom.nov., which corresponds only to those members of Odhner's "Prosostomata" in which the cercariae develop in sporocysts. The Gasterostomatida contain the Bucephalida n.ordo, within which one suborder, Bucephalata LaRue, 1926, with one superfamily, Bucephaloidea LaRue, 1926, is placed. The Prosostomatida include the orders: (i) Plagiorchiida LaRue, 1957, with the suborders Opecoelata n.subordo and Plagiorchiata LaRue, 1957; and (ii) Strigeida LaRue, 1926, with suborders Schistosomatata (Poche, 1926), Strigeata LaRue, 1926, and perhaps Brachylaemata LaRue, 1957; and provisionally the suborder Renicolata LaRue, 1957, by itself. The Opecoelata include provisionally the superfamilies Opecoeloidea Cable, 1956, Gorgoderoidea n.superf., Fellodistomatoidea LaRue, 1957, and the Zoogonoidea Skryabin, 1957. E. I. Sillman

1770—REBECQ, J. & LERAY, C., 1960. "Distomatose cérébrale chez *Diplostodius annularis* L." *Comptes Rendus des Séances de l'Académie des Sciences. Paris*, **251** (16), 1683–1684.

Rebecq & Leray record and briefly describe *Diplostomulum stahli* n.sp. (Trematoda: Strigeidae) found encysted in the optic lobes of the brain of *Diplostodius annularis* caught in the port of Bonifacio, Corsica and in the Gulf of Marseilles. They quote Dubois that this is the only known case of distomiasis in a marine teleost. The most characteristic features which serve to distinguish this parasite from other forms are (i) the distribution of the suckers—a terminal buccal, two accessory laterals slightly posterior to the level of the pharynx and a ventral larger than the oral and situated in the middle of the body; (ii) the tribocytic organ which is strongly contorted and has four principal lobes contained between the ventral sucker and the V-shaped vesicle. The paper is not illustrated. W. M. Fitzsimmons

1771—SHAKHTAKHTINSKAYA, Z. M., 1958. [A new trematode from birds of Azerbaidzhan—*Echinochasmus* (*Episthmium*) *mathevossiani* n.sp.] *Dokladi Akademii Nauk Azerbaidzhanskoi SSR*, **14** (2), 155–157. [In Russian.]

Echinochasmus (*Episthmium*) *mathevossiani* n.sp. is described and figured from *Colymbus cristatus* in Azerbaidzhan. It differs from the two nearest species, *E. (E.) intermedium* and *E. (E.) bursicola*, by the body size (maximum length 1.85 mm., maximum width 0.58 mm.), the more posterior position of the ventral sucker, the shape and size of the testes (the anterior testis is transversely elongated and measures 0.116 × 0.20 mm., the posterior testis is rounded and 0.14 to 0.17 mm. in diameter), the vitellaria, which begin some distance beyond the pharynx and do not meet medially below the ventral sucker, and the smaller eggs. G. I. Pozniak

1772—SHARPILO, V. P., 1958. [Kievski gosudarstvenni universitet, U.S.S.R.] [A new trematode, *Paralepoderma skryabinii* n.sp., from snakes.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 387–388. [In Russian.]

Paralepoderma skryabinii n.sp., described and figured from the oesophagus and mouth cavity of *Natrix natrix* and *Vipera berus*, is nearest to *P. cloacicola* but differs by the smaller body (length 1.0 mm. to 1.5 mm., maximum width 0.37 mm. to 0.58 mm.), a well developed pharynx, shorter gut caeca, the relative size of the suckers (the ventral being larger than or equal to the oral), the more compact vitellaria and their position postero-lateral to the ventral sucker, the diagonal orientation of the testes and the size of the eggs (0.043 mm. to 0.047 mm. \times 0.019 mm. to 0.021 mm.).

G. I. Pozniak

1773—SKRYABIN, A. S., 1958. [Krimski pedagogicheski institut, U.S.S.R.] [The helminth fauna of *Alepisaurus aesculapius*.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 340–344. [In Russian.]

This is a first record of helminths from the deep-water fish *Alepisaurus aesculapius*. In four specimens from the Pacific were found unidentified Tetrarhynchidae, an unidentified species of *Phyllobothrium*, larvae of *Contracaecum* (which are described) and a dinurid trematode, *Profundiella skryabinii* n.g., n.sp. In the absence of a tail appendage the new form is nearest to Prosorchinae but differs in the position of the testes behind the ventral sucker and of the ovary at the hind end of the anterior half of the body. These and a characteristic digestive system (prepharynx absent, pharynx and short oesophagus present, caeca dilating at a point one-third along the body into so-called "stomachs") allow a new subfamily, *Profundiellinae* n.subf., to be erected for the new form. A description of the new species and diagnoses of the genus and subfamily are given.

G. I. Pozniak

1774—SOGANDARES-BERNAL, F. & HUTTON, R. F., 1959. [Florida State Board of Conservation Marine Laboratory, St. Petersburg, Florida, U.S.A.] "Studies on helminth parasites of the coast of Florida. I. Digenetic trematodes of marine fishes from Tampa and Boca Ciega Bays with descriptions of two new species. 1." **Bulletin of Marine Science of the Gulf and Caribbean**, 9 (1), 53–68.

Sogandares-Bernal & Hutton report on ten species of Digenea from 11 species of marine fish, being new local records for the Tampa and Boca Ciega Bay areas of Florida. New host records are: *Diplomonorchis leiostomi* from *Bairdiella chrysurus* and *Lagodon rhomboides*, *Parahemiurus merus* from *Harengula pensacolae* and *Urophycis floridanus*, *Sclerodistomum sphoeroides* from *Chilomycterus schoepfi*, *Siphodera vinaledwardsii* from *Opsanus beta*, and *Tergestia pectinata* from *Caranx crysos*. *Lepocreadium floridanus* n.sp. from *Lagodon rhomboides* and *Megasolena archosargi* n.sp. from *Archosargus probatocephalus* are described and figured. *Lepocreadium floridanus* differs from *L. album*, *L. archosargi*, *L. bimarinum*, *L. micropogoni*, *L. ovalis*, *L. pyri-forme*, *L. setiferoides* and *L. trullaforme* by possessing a lobed as compared with an unlobed ovary; various other morphological characteristics differentiate the new species from these and the other species of *Lepocreadium*. A restudy of the type specimens of *L. archosargi* and *L. micropogoni* may show them to be synonymous with *L. ovalis*. Information concerning the anterior extent of the excretory vesicle of *L. bimarinum* and *L. trulla* and a key to *Lepocreadium* and related genera are given. *Megasolena archosargi* is closely related to *M. estrix* from which it differs by the absence of a prepharyngeal muscular ring. The genus *Megacreadium* Nagaty, 1956 is considered by the authors to be synonymous with *Schistorchis* Lühse, 1906; *Megacreadium tetraodontis* Nagaty, 1956 becomes *S. tetraodontis* (Nagaty, 1956) n.comb.

J. W. Smith

1775—SUDARIKOV, V. E. & RIKOVSKI, A. S., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR, Moscow.] [*Scolopacitrema cubrensis* n.g., n.sp. a new trematode of the family Diplostomatidae Poirier, 1886.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 360–363 [In Russian.]

Scolopacitrema cubrensis n.g., n.sp. is described and figured from the bird *Scolopax ruticola* in the Yaroslavl region. The new genus is characterized by the distribution of the vitellaria which, in the anterior section of the body, are restricted to the Brande's organ, by the presence

of an ejaculatory bursa, by the absence of lateral suckers and the strong development of the oral and ventral suckers, and by the hermaphrodite canal which opens at the top of a small papilla which lies centrally on the dorsal wall of the genital atrium. In the structure of the anterior section the genus is nearest to *Pulvinifer* and *Allodiplostomum*. G. I. Pozniak

Cestoda

- 1776**—ABULADZE, K. I., 1958. [Moskovskaya veterinarnaya akademiya, Moscow, U.S.S.R.] [The characteristics of cestodes of the genus *Cladotaenia* Cohn, 1901.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 28–31. [In Russian.]

Revising *Cladotaenia*, Abuladze leaves the following ten species in the genus: *C. globifera* (type), *C. secunda*, *C. fania*, *C. feuta*, *C. circi*, *C. vulturi*, *C. freani*, *C. oklahomensis*, *C. banghami* and *C. foxi*, and gives its diagnosis and differentiation from *Taenia*. *C. mirsoevi* is excluded on the grounds that it is the only species in this genus reported from mammals (hedgehog), and that the original authors neither describe nor figure it, and *C. melierax* (originally in *Rhabdometra*) on the presence of the paruterine organ. He agrees with Clerc (1903) and Schmelz (1941) that *C. armigera* is a synonym of *C. globifera*, and with Cohn (1901) that *C. cylindracea* belongs to one of the species of Dipylidiinae, but in view of its insufficient description leaves it as genus et species inquirendae. G. I. Pozniak

- 1777**—BAER, J. G. & BONA, F., 1960. [Institut de Zoologie, Université de Neuchâtel, Neuchâtel, Switzerland.] "Révision des cestodes Dilepididae Fuhrm., 1907 des ardeiformes. Note préliminaire." **Bollettino dell'Istituto e Museo di Zoologia dell'Università di Torino**, 6 (4), 1–53.

This preliminary note gives the generic diagnoses of dilepidid tapeworms occurring in Ardeiformes (to include the Ciconiae) with a discussion of the taxonomic position of each genus and a list of species with their synonyms and hosts. Specific diagnoses are not given. 13 species of *Parvitaenia* Burt occur in ardeiforms of which *P. macrophallica* n.sp. and *P. microphallica* n.sp., both from *Cochlearius c. cochlearius* from Brazil, and *P. ambigua* n.sp. from the same host (locality unknown), and *P. clavipera* n.sp. and *P. pseudocyclorchida* n.sp. both from *Ardea novaehollandiae* from Australia are new. Two species of *Bancroftiella*, viz., *B. ardeae* and *B. glandularis* are transferred to *Parvitaenia* as new combinations and *B. toratugumi* is transferred to *Dilepis*. *B. forna* is not accepted as a *Bancroftiella*, all the remaining species of which are parasites of marsupials. A new genus *Neogryporhynchus*, with two species in ardeiforms (synonym *Gryporhynchus* Ransom, 1909, Fuhrmann, 1932 nec v. Nordmann, 1832) is erected because v. Nordmann's genus, with *G. pusillus* as type, is a larval genus the adult of which is unknown. Characteristic of *Neogryporhynchus* is the double crown of rostellar hooks, genital ducts passing between the excretory vessels, genital atrium with spines and pouches, four testes and an horseshoe-shaped uterus. The type species is *N. cheilancristrotus* (Wedl, 1855), synonyms *Gryporhynchus tetrorchis* Hill, 1941 and *G. nycticoracis* Yamaguti, 1956. The second species, *N. lasiopeius*, recorded from *Ardea p. purpurea* from France is new. Eight species of *Valipora* Linton are listed, with the new species *V. parvitaeniunca* n.sp. from *Egretta sacra* from Australia, *V. pachipora* n.sp. from *Egretta i. intermedia* from Java and *V. glomovaginata* n.sp. from *Ardea p. purpurea* from France. *Taenia campylancristrota*, *Dilepis ardeolae*, *Lateriporus spinosus* and *Ophiovalipora minuta* are transferred to *Valipora* as new combinations. Of eight species of *Dendrouterina* Fuhrm., *D. australensis* from a "grey heron" from Australia is new. *Dilepis macrospincter*, *Cylustera fuhrmanni*, *D. papillifera* and *D. crassirostrata* are placed in *Dendrouterina*. The genera *Proorchida* Fuhrm., *Cyclorchida* Fuhrm., *Cylustera* Fuhrm., *Dilepis* Weinland and (?) *Clelandia* Johnston have each one species in ardeiforms and *Anomotaenia* Cohn has three. Of the three species of *Paradilepis* Hsü, *P. patriciae* from *Platibis flavipes* from Australia is new and *Paradilepis transfuga* is a new combination for *Taenia*. A new genus *Nasutaenia* is erected, with *N. nasuta* (Fuhrmann, 1908) n.comb. (for *D. nasuta*) as type, characterized by eversible, unilateral genital atria,

genital ducts passing between the excretory vessels, inverted aporal excretory vessels and a reticulate uterus that probably breaks down into egg capsules. *Choanotaenia ricci* becomes *Anomotaenia ricci* n.comb. There are four species *inquirendae* and *incertae sedis*. A table summarizing important generic characters is given and there are 16 full page figures.

J. Mahon

1778—BEVERLEY-BURTON, M., 1960. [Department of Zoology, University College of Rhodesia and Nyasaland, Salisbury, Southern Rhodesia.] "A new dilepidid cestode, *Mashonalepis dafyddi* n.g., n.sp., from the gray heron, *Ardea cinerea* L." **Journal of Parasitology**, 46 (4), 487-490.

A new dilepidid cestode, *Mashonalepis dafyddi* n.g., n.sp. from *Ardea cinerea* is described. This new genus is compared with other genera of the subfamily Dilepidinae Fuhrmann, 1907, which have a distinctive musculature associated with the genital atrium; it has an affinity with *Valipora* but the musculature of the genital atrium is confined to an almost spherical, proximal sphincter, some of the testes are pre-ovarian and there is only one pair of longitudinal excretory vessels ventral to the genital ducts.

M. Beverley-Burton

1779—CHIZHOVA, T. P., 1958. [I Moskovski meditsinski institut, U.S.S.R.] [On the specific identity of *Diphyllobothrium strictum* Talysin, 1932 and *D. dendriticum* Nitzsch, 1824.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR**, pp. 384-386. [In Russian.]

Diphyllobothrium strictum from man in the Baykal area was erected on the basis of the doubling of the genital complex in the posterior segments. Working on its life-history, Chizhova (1947) observed also three- and four-fold multiplications of the genitalia showing this character to be inconstant and also a similar doubling of sex organs in species of *Diphyllobothrium* from gulls in Kirgizia. Recent work on the species of *Diphyllobothrium* and a comparison of the characters of *D. strictum* and *D. dendriticum* show these two species to be synonymous.

G. I. Pozniak

1780—KHALIL, L. F., 1960. [Department of Parasitology, London School of Hygiene and Tropical Medicine, London, W.C.1, England.] "On a new genus, *Sandonella*, for *Proteocephalus sandoni* Lynsdale, 1960, (Proteocephalidae) and the erection of a new subfamily, Sandonellinae." **Journal of Helminthology**, 34 (1/2), 47-54.

Khalil describes cestodes from the fish *Heterotis niloticus* from the Sudan, which he identifies with material described by Lynsdale, 1960 [for abstract see No. 1781 below] as *Proteocephalus sandoni* and adds the information that the anterior end of the scolex bears two lappet-like structures and not an apical sucker; also that the two compact vitelline glands lie posterior to the ovary, contained within the medulla. Khalil discusses the variation in position of the vitelline glands in the Proteocephalidae and demonstrates a trend from two lateral bands to a position behind the ovary as shown in Lynsdale's species, for which he erects *Sandonella* n.g. Since none of Woodland's eight subfamilies has similarly placed vitelline glands, Khalil erects a new subfamily Sandonellinae, with the ovary, testes, yolk glands and uterus in the medulla and with the yolk glands compactly arranged in two bands posterior to the ovary. The type genus is *Sandonella*. A key to the nine subfamilies is given and there are seven figures and 23 references.

J. Mahon

1781—LYNSDALE, J. A., 1960. [Department of Parasitology, London School of Hygiene and Tropical Medicine, London, W.C.1., England.] "On *Proteocephalus sandoni* n.sp. from the Sudan." **Journal of Helminthology**, 34 (1/2), 43-46.

Lynsdale describes a proteocephalid cestode from a fish, *Heterotis niloticus*, from the Sudan and on comparison with the eight species of *Proteocephalus* already described as having a fifth apical sucker finds that her material differs by the position of the vagina posterior to the cirrus pouch, the number and arrangement of the testes, the number of uterine branches and also the geographical distribution. In the original account *P. pentastoma* from *Polypterus bichir* is described with an apical sucker, the vagina posterior to the cirrus pouch and a similar geographical distribution, but it has a smaller head, more testes and is harboured by a different group of hosts. Lynsdale accordingly erects *Proteocephalus sandoni* n.sp. There are two figures and three references.

J. Mahon

1782—METTRICK, D. F., 1960. [Zoology Department, University College of Rhodesia & Nyasaland, Salisbury, Southern Rhodesia.] "A new tapeworm, *Choanotaenia angolensis*, n.sp. from the Angola pitta, *Pitta angolensis*, in Southern Rhodesia." *Journal of Parasitology*, **46** (3), 398–399.

Among other characters, specimens of dilepidid cestodes collected by Mettrick from a passerine bird *Pitta angolensis* have a length of 73 mm., scolex diameter 350μ to 390μ armed with a double crown of 22 rostellar hooks, 80μ in length. The genital pores are irregularly alternating and there are 31 to 34 testes lying behind the ovary. The cirrus pouch measures 180μ to 190μ by 42μ . These specimens are named *Choanotaenia angolensis* n.sp. Of the 14 species of *Choanotaenia* recorded from Passeriformes those 10 species with a double crown of hooks or number of crowns unknown are listed. There are two figures and three references. J. Mahon

1783—METTRICK, D. F., 1960. [Department of Zoology, University College of Rhodesia & Nyasaland, Salisbury, Southern Rhodesia.] "Two new species of the genus *Paruterina* Fuhrmann, 1906, from passeriform birds in Southern Rhodesia." *Proceedings of the Helminthological Society of Washington*, **27** (2), 181–184.

Paruterina zambiensis n.sp. from *Campephaga phoenicea* and *P. pentamyzos* n.sp. from *Prinops plumata paliocephala* are distinguished from the other 21 species in the genus described from passeriform birds, on the basis of irregularly alternating genital pores, the size, shape and number of the rostellar hooks, the number and size of the testes, size of cirrus sac and the arrangement of the paruterine organ. In neither of the two species were eggs actually observed in the paruterine organ, and the author has assumed, in placing them in the genus *Paruterina*, that the material was not fully gravid. D. Mettrick

1784—OSHMARIN, P. G., 1958. [Dalnevostochnii filial Sibirskogo otdeleniya Akademii nauk SSSR, U.S.S.R.] [*Skrjabinoparaksis arsenjevi* n.sp. and its position in the Hymenolepididae.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 257–260. [In Russian.]

Oshmarin describes a new *Skrjabinoparaksis*, *S. arsenjevi* n.sp. from the intestine of *Nyroca maxila* from the Maritime Territory, with characteristically spined suckers, one testis per proglottis and the male and female sex organs appearing almost simultaneously. The species showed teratological variation in the proglottis structure, as for example, two testes per segment. Oshmarin considers that *Skrjabinoparaksis* belongs not in the tribe Aploparaksee (see *taenia* recorded from Passeriformes those 10 species with a double crown of hooks or number of crowns unknown are listed. There are two figures and three references. J. Mahon

G. I. Pozniak

1785—SAAKOVA, E. O., 1958. [Leningradski gosudarstvenni universitet, U.S.S.R.] [Two new genera of the family Hymenolepididae from birds of the Danube Delta.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 310–314. [In Russian.]

Two new intestinal hymenolepidids of birds are figured and described from the Danube Delta. *Gonoscolex paradoxus* n.g., n.sp. from *Limosa limosa* possesses a characteristic accessory sac, named by Saakova the gonoscolex, at the mouth of the cirrus pouch which is similar to the external Fuhrmann's body. The gonoscolex is eversible, is covered by spines and bears a crown of 10 to 15 hooks. Its function is thought to be the attachment of the worm. *Arhynchotaenia clausovaginata* n.g., n.sp. from *Netta rufina* has characteristic massive chitinous clamps at the vaginal opening, a powerful sphincter at the entrance to the seminal receptacle, and the scolex lacks even a rudimentary rostellum. *Arhynchotaenia* is nearest to *Orlovilepis*. G. I. Pozniak

1786—SINHA, P. K., 1960. [Bengal Veterinary College, Calcutta, India.] "*Railletina dattai* n.sp. from poultry (*Gallus gallus domesticus*) in India." *Journal of Parasitology*, **46** (4), 485–486.

Railletina dattai, a new species of cestode from the domestic fowl is described briefly by Sinha. He found that it resembled *R. (R.) volzi* in many features but was distinctive in having 23 to 25 testes, an hour-glass shaped cirrus sac and eggs 29μ to 32μ in size. I. L. Owen

1787—SPASSKAYA, L. P., 1958. [Moskovski meditsinski institut, U.S.S.R.] [Two new species of cestodes from birds in Tuva.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 349–353. [In Russian.]

Spasskaya describes two dilepidids from the Tuva area. *Anomotaenia skryabini* n.sp. from *Emberiza leucocephala* is provisionally placed in this genus; it has an unarmed rostellum and an exceptionally large rostellar sac. The new species is near to *A. borealis* in general morphology and structure of sex organs, and to *A. reductorhyncha* in the reduced rostellar armature; it differs from the latter species chiefly in the larger number of testes (30) and a longer cirrus bursa. *Choanotaenia anthusi* n.sp. from *Anthus trivialis* is characterized by cuticular spines which cover the base of the suckers; it differs from the only other species with cuticular spines parasitic in passeriform birds, *C. spinoscapite*, in that in the latter the spines cover the entire scolex, and also in the size of the hooks (in *C. anthusi* they are 0.028 mm. to 0.030 mm. long). In the size and number of hooks, the new species is near *C. galbulae* and *C. musculosa* but from the first it differs in having a shorter hook blade and from the second in having half the number of testes.

G. I. Pozniak

1788—VIK, R., 1957. [Zoological Museum, University of Oslo, Norway.] “Studies of the helminth fauna of Norway. I. Taxonomy and ecology of *Diphyllbothrium norvegicum* n.sp. and the plerocercoid of *Diphyllbothrium latum* (L.).” **Nytt Magazin for Zoologi.** Oslo, 5. 26–93.

Vik carried out parasite surveys on about 3,000 fishes representing 13 species, about 300 birds representing 21 species and about 600 mammals representing nine species from different parts of Norway during 1943 and 1950–57. Data on the animals collected from each area are accompanied by a map and a description of the area. Some material published in an earlier paper by Vik is used in the present work [for abstract see Helm. Abs., 23, No. 471a]. This paper deals only with *Diphyllbothrium norvegicum* n.sp. and *D. latum*. *D. norvegicum* n.sp. is described and figured together with a detailed account of its development. The egg, coracidium and proceroid are found in *Cyclops strenuus*, the plerocercoid stage I in sticklebacks and the plerocercoid stage II in char, grayling and trout, and the adult worm in *Larus canus*, *Pica pica*, *Vulpes vulpes* and the cat. The results of numerous experiments of feeding plerocercoids to various fishes, birds and mammals are tabulated and discussed at length. The following were experimentally infected with *D. norvegicum*: *Ardea cinerea*, *L. argentatus*, *L. marinus*, *L. ridibunda*, *Sterna hirundo*, rats and man. In these experiments with man, cestode eggs appeared in the faeces 12 to 14 days after feeding plerocercoids; treatment with male fern extract was successful. Any immunity acquired by man against reinfection with *D. norvegicum* did not last for more than six days. The large size of the plerocercoids of *D. norvegicum* (some being 600 mm. in length) is given among the characteristics differentiating the new species from other species of the genus. The large plerocercoids of *D. cordiceps* differ from those of the new species in the size of the scolex and calcareous bodies. Vik states that in *D. cordiceps* “the shape of the eggs is noticeable (70 mm. \times 35 mm.)” [presumably 70 μ \times 35 μ] “and would clearly distinguish this worm from *D. norvegicum*”. The author is unable to differentiate the adults of *D. norvegicum* and *D. cordiceps* until feeding experiments with the plerocercoids of the latter have been carried out. No trout younger than three years or shorter than 20 cm. was found infected with *D. norvegicum* plerocercoid stage II. Epizootics killing large numbers of trout have never been established; infected spawning trout do not develop the thick mucous skin and the scales are loose. The plerocercoids of *D. latum* were found in perch and pike in Pasvik, and the infection has been established as endemic in Norway for the first time. 121 references are given.

J. W. Smith

Acanthocephala

1789—MACHADO F., D. A., 1960. [Instituto Oswaldo Cruz, Rio de Janeiro, Guanabara, Brazil.] “Um novo gênero da família Quadrigyridae Van Cleave, 1920 (Metacanthocephala, Palaeacanthocephala).” **Revista Brasileira de Biologia**, 20 (1), 79–84.

Machado Filho describes and figures *Palliolisensis* n.g. on the basis of two species collected from *Triporthus paranensis* and *T. angulatus*. The new genus is characterized as Quadrigyridae with a cylindrical proboscis which has six oblique rows of hooks and a small to medium size

trunk. The trunk has five circles of cuticular spines in the anterior region. The subcuticular nuclei are branched and the brain is in the lower part of the proboscis receptacle. The type species is *P. quinqueungulis* n.sp. from Brazil. *P. ornatus* n.sp. is described on the basis of one male specimen from Paraguay; this species differs from *P. quinqueungulis* in that it has only 16 cuticular spines in each circle while *P. quinqueungulis* has 20, the testes are of equal size and the proboscis hooks are larger.

W. L. Bullock

Nematoda

1790—ALI, S. M., 1960. [Department of Zoology, University College of Science, Osmania University, Hyderabad-Deccan, India.] "On two new species of *Procamallanus* Baylis, 1923 from India, with a key to the species." *Journal of Helminthology*, **34** (1/2), 129-138.

Procamallanus globoconchus n.sp. is described from three male specimens found attached to the gills of *Rita hastata* in Hyderabad. The new species is similar to *P. fulvidraconis* in having a very small left spicule and circum-anal papillae but differs in the greater relative length of the right spicule, which is eight times longer than the left in *P. globoconchus* and five times in *P. fulvidraconis*, in having asymmetrical caudal alae on the male and in lacking markings in the shape of *Unio* on the buccal capsule. *P. ophicephalus* n.sp. is described from one male found on the gills of *Ophicephalus punctatus* in Hyderabad Deccan. It is characterized by two pairs of circum-anal papillae, broad symmetrical caudal alae, sickle-shaped markings on the buccal capsule and the lengths of the spicules, the right being 0.15 mm. and the left 0.034 mm. *Aspiculus* n.subg. of the genus *Procamallanus* is proposed for *P. aspiculus* Khera, 1955. The genus, therefore, contains four subgenera, *Procamallanus* Baylis, 1923, *Aspiculus* n.subg., *Monospiculus* Ali, 1956 and *Isospiculus* Ali, 1956. A key is given to the subgenera and to the species of the genus *Procamallanus*.

W. G. Inglis

1791—ALLGÉN, C. A., 1958. "Zur Kenntnis norwegischer Nematoden. XXIV. Über einige für Norwegen neue freilebende marine Nematoden." *Kongelige Norske Videnskabers Selskabs Forhandling*, Year 1957, **30**, 22-28.

Allgén describes and figures *Leptosomatina appendixo-caudatum* n.sp., *Thoracostoma sivertseni* n.sp., *Phanoderma robustum* n.sp. and *Halichoanolaïmus labiolaimus* n.sp., and augments the description of *Filoncholaïmus filicaudatus* (Ditlevsen, 1926) Filipev, 1927, found for the first time in Norwegian waters.

R. D. Winslow

1792—ALLGÉN, C. A., 1958. [Stallmästgatan 21c, Malmö V, Sweden.] "Eine Tragödie in der Boden-Mikrofauna." *Mikrokosmos*, **47** (9), 210-211.

In a sample from a fiord on the west coast of Sweden, Allgén found a juvenile specimen of a marine nematode with the rear end of a smaller male nematode projecting from its mouth. The prey was not identifiable but the predator is described as *Sphaerolaimus datilaimus* n.sp., the description apparently being based on the single juvenile specimen although the species was evidently common ("häufig vorkommend") in the sample.

R. D. Winslow

1793—ALTHERR, E., 1960. "Results from the Danish Expedition to the French Cameroons (1949-1950). XXVIII. Nématodes limnicoles." *Bulletin de l'Institut Français d'Afrique Noire. Série A: Sciences Naturelles*, **22** (3), 770-787.

Altherr reports on a collection of free-living fresh-water nematodes from the French Cameroons and records 10 species, of which six are new, and identifies a further two forms as far as the genus only. *Paraphanolaimus longisetosus* n.sp. (based on one female) is similar to *P. behningi* but differs in the larger amphid with two to two-and-a-quarter spirals, the parallel heavily cuticularized walls of the buccal cavity, the more marked cuticular striations and the longer cephalic setae (0.006 mm. to 0.007 mm.). *Mononchus abrupticaudatus* n.sp. (based on females and larvae) is characterized by a short, markedly curved tail. *Dorylaimus dahli* n.sp. (based on males, females and juveniles) is characterized by six to seven pre-cloacal papillae, a simple guide ring for the spear and by various measurements. *Actinolaimus mpoumensis* n.sp. (based on females and juveniles) is characterized by the position of the

vulva (V=47–50), the cuticularization of the buccal cavity and by various measurements. *D. nyongi* n.sp. (based on one female) is characterized by the form of the lips, the vagina and the oesophagus, by the position of the pre- and post-anal papillae and by various measurements. *A. birketi* n.sp. (based on three females) is characterized by a non-chitinous buccal cavity and by various measurements. One female specimen is referred to *Tripyla* (?*papillata*, ?*cornuta*); one female is referred to *Iotonchus* (*Mononchus*) *daday*; six males are referred to *A. papillatus* which is redescribed; and one female is referred to *Longidorella chappuisi*. All the specimens were collected from the river Nyong. W. G. Inglis

1794—ALWAR, V. S. & ACHUTHAN, H. N., 1960. [Madras Veterinary College, Madras, India.] "On a new species of whipworm—*Trichuris raoi* from a camel." *Indian Veterinary Journal*, **37** (10), 500–501.

Trichuris raoi n.sp. is described from one male specimen recovered from the caecum of a circus camel in Madras. The new species is characterized by the proportion of the anterior to the posterior portions (17·8:15·8), the form of the spicule and spicular sheath and by the nature and measurements of the gonads. W. G. Inglis

1795—AMIR, S. & ALI, S. M., 1960. [Department of Zoology, Osmania University, Hyderabad, Deccan, India.] "On a new species of *Splendidofilaria* Skrjabin, 1923 from India." *Journal of Helminthology*, **34** (1/2), 139–140.

Splendidofilaria kashmirensis n.sp. from the vicinity of the heart and the body-cavity of *Molpastes l. leucogenys* in Kashmir is the fourth species of the genus and is characterized by the presence of only two pairs of caudal papillae and subequal, rather long spicules, 0·095 mm. to 0·12 mm. and 0·078 mm. to 0·083 mm. in length. W. G. Inglis

1796—ATAKHANOV, S. A., 1958. [Termezski pedagogicheski institut, U.S.S.R.] [Seven new species of nematodes.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 42–49. [In Russian.]

Atakhanov describes and figures seven new species of eelworms from various plants (of which only Russian popular names are given) from Kara-Kalpak. They are: (i) *Diplogaster paramonovi* n.sp. (females) differs from the near *D. longicaudatus* by the characteristic structure of the lips, a narrower anterior section of the oesophagus and a somewhat longer tail (23% of the 955 μ to 1,000 μ body length); (ii) *Cephalobus kipchaus* n.sp. (females) of which no differential diagnosis is given; (iii) *Eucephalobus tulaganovi* n.sp. (females) is near to *E. elongatus* and differs from this and other species of the genus by its smaller size ($L=245-263\cdot5\mu$, $\alpha=12-12\cdot5$, $\beta=3\cdot4-3\cdot6$, $\gamma=6-6\cdot12$); (iv) *Acrobeles pachidinovae* n.sp. (females) of which no differential diagnosis is given; (v) *Ditylenchus sapari* n.sp. (females) is differentiated from other species of the genus by the presence of a wide head plate; (vi) *Hexatyclus beljaevae* n.sp. (females) differs from other species of the genus by the flattened head which is not offset from the body and the conical, rounded tail with a terminal, well defined, small spine; and (vii) *H. skarbiloviezae* n.sp. (males and females) differs from other species in the genus by the structure of the tail, which in the female is conical and blunt, and in the male is pointed and flanked by the bursa which extends to the tip. G. I. Pozniak

1797—BABERO, B. B., 1960. [Department of Biology, Southern University and A. & M. College, Baton Rouge, Louisiana, U.S.A.] "Further studies on helminths of the opossum, *Didelphis virginiana*, with a description of a new species from this host." *Journal of Parasitology*, **46** (4), 455–463.

Babero reports on helminth parasites recovered from the opossum (*Didelphis virginiana*) in the State of Georgia, U.S.A. *Capillaria longicauda* Freitas & Lent, 1935, *Dipetalonema* sp. (probably a new species), *Dirofilaria* sp. (single specimen from the heart), *Gongylonema longispiculum* Shults, 1927 and an unidentified acanthocephalan are new host records. *Trichuris mimuta* Rudolphi, 1819, is redescribed and figured. *T. didelphis* n.sp. is characterized by female characters and by the presence of a papilla, the shape and spination of the bursal sheath and the length of the worm in the males. *T. urichi* is considered a synonym of *T. marsupialis*.

W. G. Inglis

- 1798—BARANOVSKAYA, I. A., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR, Moscow, U.S.S.R.] [New nematodes from graminaceous plants in the Moscow area.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 55-58. [In Russian.]

Two new species of plant-parasitic nematodes are described from the Moscow region. *Rhabditis* (*Mesorhabditis*) *signifera* n.sp., females and larvae of which were collected from the roots of spring wheat and maize, has one ovary and is nearest to *R. tenuispicula* from which it differs by the presence of head bristles, the proximity of the phasmids to the anus, the position of the vulva and the structure of the posterior oesophageal bulb. *Aphelenchoides clarolineatus* n.sp. from the roots of *Agropyron repens* differs from other species of the genus by the wide lateral fields, the large oval oesophageal bulb and the elongated conical tail which terminates in an obtuse tip in the shape of an equilateral triangle.

G. I. Pozniak

- 1799—CHABAUD, A. G., CAMPANA-ROUGET, Y. & BRYGOO, E. R., 1960. [Institut de Parasitologie, 15 Rue de l'École de Médecine, Paris, France.] "Les nématodes Seuratoidea." **Annales de Parasitologie Humaine et Comparée**, 35 (3), 316-346.

After considering the structure of the genus *Seuratum* and many related genera the authors conclude that the families Quimperiidae and Seuratidae cannot stand as separate groups. They therefore recognize only one family, Seuratidae, for which they propose a new superfamily Seuratoidea. This superfamily is referred to the Ascaridina where it appears to be closely related to the Cosmocercoidea on one side and to form a link between the Ascaridina and Spirurida, through the Cucullanidae, on the other. The superfamily contains only one family which is divided into seven subfamilies, thus: Seuratinae with four genera, *Seuratum*, *Skrjabinura* (= *Seuratinema*), (?) *Denticulospirura*, (?) *Rictularina*; Schneidernematinae, with two genera, *Schneidernema* and *Morgascaridia*; Skrijabinelaziinae, with one genus, *Skrjabinelazia*; Gendriinae, with three genera, *Gendria*, *Paragendria*, *Buckleyinema*; Pinginae, with three genera, *Pingus*, *Cottocomephoronema*, *Haplonema*; Quimperiinae, with four genera, *Quimperia*, *Paraquimperia*, *Ichtyobronema*, (?) *Paraseuratum*; Omeiinae, with one genus, *Omeia* (= *Harantinema*).

W. G. Inglis

- 1800—CHABAUD, A. G. & LE VAN HOA, 1960. [Institut de Parasitologie, Université de Paris, Faculté de Médecine, Paris VI^e, France.] "Adaptation à la vie tissulaire d'un nématode aphasmidien." **Comptes Rendus des Séances de l'Académie des Sciences.** Paris, 251 (17), 1837-1839.

The authors describe *Diectowittus wittei* n.g., n.sp., collected in the Belgian Congo from a snake, *Psammophis sibilans sibilans*. The form of the parasite suggests that its habitat was a tissue, probably a hollow organ such as a pulmonary diverticulum. *Diectowittinae* n.subf. of *Diectophymatidae* is erected for it; the new subfamily has a distinctive but non-functional oesophagus and an intestine transformed into a trophosome; the tail of the male bears a vestigial genital sucker and the spicule is absent; the female has an anterior vulva and embryonated eggs. The male is 9 cm. long and also lacks cloacal papillae, rectum and gubernaculum. The largest available fragment of a female was 40 cm. long, its anus was absent and the genital tube single and straight. The eggs are smooth, flattened, with a mucous plug at each pole around which is inserted a tuft of long fine bristles and they contain an embryo ready to hatch. The most mature ova are found nearest the vulva. Features such as the structure of the ova, the female genitalia and the caudal sucker of the male indicate an affinity with the *Diectophymatidae*. The polar filaments on the ova indicate that the intermediate host is almost certainly aquatic.

W. M. Fitzsimmons

- 1801—CHITWOOD, B. G., 1960. "A preliminary contribution on the marine nemas (Adenophorea) of Northern California." **Transactions of the American Microscopical Society**, 79 (4), 347-384.

Representatives of the families Ironidae, Oncholaimidae and Enchelidiidae are described and figured, and their taxonomic position thoroughly discussed. Keys are given to the genera of Ironinae and Oncholaiminae, and to the species of *Dolicholaimus*, *Anoplostoma*, *Oncholaimium*, *Metoncholaimus* and *Pareurystomina*. *D. raskii* n.sp. is close to *D. oceanus* but differs in the complex gubernaculum and more posterior vulva. *Oncholaimus dujardinioides* n.sp. is related

to *O. dujardini* but differs in the size and proportions of the stoma and the position of the excretory pore and vulva. *Oncholaimium sheri* n.sp. is closest to *O. appendiculatum* but the pre-anal supplement is non-pedunculate and the spicules are straight and much shorter. *Viscosia papillatoides* n.sp. differs from *V. macramphida* in the much shorter tails of both sexes and from *V. papillata* mainly by small differences in length of spicules and position of the vulva. *Metoncholaimus longiovum* n.sp. is distinguished by many characters including the presence of a gubernaculum, absence of conoid ventral supplementary papillae posterior to the male genital setae and spicules 306μ long. *Pontonema problematicum* n.sp. differs from *P. papilliferum* and *P. parvum* by its longer spicules and from *P. californicum* by its more posterior excretory pore. Peculiar pigment spots behind the amphidial pouches were noted. *Pareurystomina atypica* n.sp. has two rows of stomatal denticles and spicules 36μ to 39μ long. Other species described and figured are: *Thalassironus brittanicus* (from type material of de Man), *Anoplostoma viviparum*, *Oncholaimus skawensis*, *Oncholaimium domesticum* (= *O. oxyure domesticum* (B. G. Chitwood & M. B. Chitwood, 1938) Timm, 1952), *Thoonchus ferox*, *Polygastrophora septembulba* and *Eurystomina ornatum*. A new combination is made: *Thalassironus bipartitus* (Wieser, 1953) n.comb. (= *Parironus bipartitus*). R. W. Timm

1802—DAS, K. M. & WHITLOCK, J. H., 1960. [New York State Veterinary College, New York, U.S.A.] "Subspeciation in *Haemonchus contortus* (Rudolphi, 1803) Nemata, Trichostrongyloidea." *Cornell Veterinarian*, 50 (2), 182-197.

When the African species of *Haemonchus* from wild ruminants and the multiple-pronged spicular forms are ignored, the better known species from domestic animals may be arranged in a spectrum on the basis of decreasing length of spicule as follows: *H. longistipes*, *H. placei*, *H. contortus*, *H. similis*. This spectrum also represents increasing development and stability of the vulvar flap. *H. placei* is probably a cattle-adapted subtropical strain and probably a valid species with demonstrable subspecies. At least two forms comparable to the Australian strain exist in Florida and Oklahoma; in India its place is apparently taken by *Mecistocirrus*. The authors discuss subspeciation of *H. contortus* and both from personal observation and study of the literature designate two new subspecies and suggest a probable third which, for lack of sufficient evidence, is for the present considered as a variety. Thus they define *H. contortus cayugensis* n.subsp., type host sheep, type location Dryden, New York, U.S.A., as a population in which the vulvar flap is linguiform in under 30%, knobbed in under 15% and smooth in over 60% and the range of mean host population spicule length is 409μ to 468μ ; *H. contortus contortus* n.subsp., type host sheep, type location Yeerongpilly, Queensland, Australia, as a population in which the vulvar flap is linguiform in over 80%, knobbed in under 10% and smooth in under 10% and the range of mean host population spicule length is 410μ to 434μ ; *H. contortus* var. *utkalensis*, type host sheep (?) and goat, type location Cuttack District, Orissa, India, as a population in which the vulvar flap is linguiform in 20% to 55%, knobbed in 40% to 60% and smooth in under 20% and the range of mean host population spicule length is 407μ to 410μ (?). The authors consider it probable that "these morphological mirrors are reflections of true bionomic differences". W. M. Fitzsimmons

1803—DELYAMURE, S. L. & KLEINENBERG, S. E., 1958. [New data on the helminth fauna of the white whale.] *Byulleten Moskovskogo Obshchestva Ispitatelei Prirodi. Otdel Biologicheskii*, 63 (3), 25-32. [In Russian: English summary p. 31.]

The helminth fauna collected from five *Delphinapterus leucas* in Tarkhanov (west coast of the Kalinin strait) included *Odhneriella seymouri*, *Otophocaenurus oserskoi*, *Anisakis kiukenthalii* and *Stenurus arctomarinus* n.sp. The new species is differentiated from the five species in *Stenurus*; its principal differential characters are the larger body and oesophagus, the structure of the female (which is similar to that of *Halocercus*) and the shape of the bursa. The authors question the validity of *S. pallasii* (v. Beneden, 1870) and as a result of a comparative study of *S. pallasii*, *O. oserskoi* and *S. arctomarinus*, come to the conclusion that in the description of *S. pallasii* the characteristics of two species have been mixed, i.e., the body size and the bursa appear to be those of *O. oserskoi* and the spicules and some other characters those of *S. arctomarinus*. The paper concludes with a geographical analysis of the helminth fauna of white whales. G. I. Pozniak

1804—EVERARD, C. O. R., 1958. [Department of Chemistry, and Biology, The Polytechnic, Regent Street, London, W.1, England.] "*Panagrolaimus salinus* n.sp. (Nematoda: Panagrolaiminae)." *Annals and Magazine of Natural History*, Series XIII, 1 (7), 459-464.

Panagrolaimus salinus n.sp. (male and female) is described and figured. It is distinguished from *P. superbus* and *P. subelongatus* by having well developed cheilorhabdions which are hexagonal in section; also in the position of the vulva and in the number and arrangement of the male anal papillae. The size and shape of the oesophagus is constant, the isthmus being about half the length of the corpus; this character, together with general body measurements and male tail shape, separates *P. salinus* from *P. goodeyi* and *P. mycophilus*. *P. salinus* was associated with decaying matter and dead leaf blades of *Puccinilia maritima* in brackish water. It was cultured on rabbit dung agar and in solution and could actively reproduce in a salinity range of 0 to 35 S⁰/₀₀, this range being greater than that observed at the type locality.

D. J. Hooper

1805—FOTEDAR, D. N., 1960. [Department of Zoology, S.P. College, Srinagar, Kashmir.] "On a new species of *Oxysomatium* Railliet and Henry, 1913 and some notes on the genera *Oxysomatium* and *Aplectana*." *Journal of Helminthology*, 34 (1/2), 141-150.

Oxysomatium srinagarensis n.sp. is described from the rectum of *Bufo viridis* at Srinagar, Kashmir. It is characterized by possessing a gubernaculum, by the distribution of the caudal papillae on the male tail and by various measurements and ratios. Fotedar discusses the inter-relationships of the genera *Aplectana* Railliet & Henry, 1916 and *Oxysomatium* Railliet & Henry, 1913 and concludes that they cannot be separated. The former name is therefore a synonym of the latter.

W. G. Inglis

1806—FREITAS, J. F. TEIXEIRA DE, 1959. [Instituto Oswaldo Cruz, Laboratorio de Helminologia, Caixa Postal 526, Rio de Janeiro, Brazil.] "Estudos sobre Oxyascarididae (Travassos, 1920) (Nematoda, Subuluroidea)." *Memorias do Instituto Oswaldo Cruz*, 56 (2), 489-559.

The family Oxyascarididae Travassos, 1920 is considered to consist of two subfamilies and three genera, thus, Oxyascaridinae with *Oxyascaris* Travassos, 1920 and *Pteroxyascaris* Freitas, 1958, and Megalobatrachonematinæ Freitas, 1958 with *Megalobatrachonema* Yamaguti, 1941 [but see Hartwich 1960; for abstract see No. 1814 below]. The family is referred to the Subuluroidea and is characterized as having three poorly developed lips, lacking a vestibule but having a pharynx and an oesophagus divided into a corpus, isthmus and posterior glandular bulb with valves. The males have equal spicules but no caudal alae. The subfamily Oxyascaridinae is characterized by a well differentiated isthmus and by the male lacking a ventral sucker, while Megalobatrachonematinæ is characterized by the isthmus being undifferentiated and by the male possessing a sucker. *Oxyascaris* contains two species, *O. oxyascaris* Travassos, 1920 (type species) which is redescribed and recorded from two new hosts (*Leimadophis poecilogyrus* and *Herpetodryas carinatus*) and *O. necopinus* n.sp. The new species was collected from *Leptodactylus sibilatrix* (type host), *L. ocellatus* and *Pleurodema diplostris* in Brazil and is characterized by the smaller size of the oesophagus and the relatively much more posterior position of the excretory pore than in *O. oxyascaris*. *Pteroxyascaris* contains two species, *P. similis* (Travassos, 1920) (type species) which is redescribed and reported from *Leptodactylus pentadactylus* for the first time, and *P. caudacutus* n.sp. from *Hyla nasica* in Brazil. The new form is distinguished by the shorter oesophagus and by the possession of a longer caudal appendage and a more anteriorly situated vulval opening. *Megalobatrachonema* contains one species, *M. nipponicum* Yamaguti, 1941 and Yamaguti's description and figures are reproduced.

W. G. Inglis

1807—FREITAS, J. F. TEIXEIRA DE & DOBBIN, Jr., J. E., 1960. "Nota prévia sobre novo nemátodo Strongyloidea parasito de quiróptero." *Atas da Sociedade de Biologia do Rio de Janeiro*, 4 (4), 56-58.

Didactyluridae n.fam. and Didactylurinae n.subf. (Strongyloidea) are erected for the reception of *Bidigiticaudata* Chitwood, 1938 [for abstract see Helm. Abs., 7, No. 243b] (which is transferred from the Ollulanidae Skryabin & Shikhobalova, 1952 [for abstract see Helm. Abs., 21, No. 1002]) and of *Didactyluris embryophilum* n.g., n.sp. from the small intestine of the bat

Glossophaga soricina in Pernambuco, Brazil. The new family is close to the Ollulanidae from which it is distinguished by the presence of a cephalic cuticular dilatation, the didelphic genitalia and bidigitate caudal extremity of the females and by the absence of externo-dorsal rays in the male bursa. *Didactyluris* differs from *Bidigiticauda* in possessing lips, by the caudal appendices of the female being situated dorsally and ventrally and by the delicate dorsal bursal ray which is bifurcate for half its length, its branches also being bifid. [No figures illustrate the paper.]

W. M. Fitzsimmons

1808—FREITAS, J. F. TEIXEIRA DE & MACHADO DE MENDONÇA, J., 1960. "Nota prévia sobre um novo gênero de nematódeo tricostrongilídeo da subfamília Graphidiinae Travassos, 1937." *Atas de Sociedade de Biologia do Rio de Janeiro*, 4 (4), 47-50.

Brevigraphidium dorsarium n.g., n.sp. is described, but not illustrated, from *Myrmecophaga tridactyla* in Mato Grosso, Brazil. The new genus differs from three members of Graphidiinae, namely, *Graphidioides*, *Graphidiops* and *Caenostongylus* by its externo-dorsal rays not having a common trunk with the dorsal ray. It differs from *Graphidium* by the absence in it of cervical papillae, by the body of the female not being suddenly attenuated in the post-vulvar region, by the ovejector having unequal branches, by its externo-dorsal rays not reaching the margin of the bursa, by its dorsal ray being deeply bifurcate and the shortest of the bursal rays, by its spicules having non-fasciculate (undivided) distal extremities and by the gubernaculum being well developed; it differs from *Paragraphidium* by its short and deeply bifurcate dorsal ray, by the non-fasciculate spicule extremities and by the presence of a gubernaculum.

W. M. Fitzsimmons

1809—GERLACH, S. A., 1957. [Zoologisches Institut der Universität Kiel, West Germany.] "Marine Nematoden von der Kongo-Mündung." *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique*, 33 (28), 1-16.

Twenty species of marine nematodes were collected from the Atlantic coast of Africa. The nematode fauna is similar to that of the European and American coasts, especially the mangrove region of Brazil. *Mesacanthion africanum* n.sp. is near *M. diplochma* but has longer cephalic setae and a longer right spicule. Other species described and figured include: *Oxystomina affinis*, *Anoplostoma viviparum*, *Oncholaimus oxyuris*, *Acanthonchus viviparus*, *Dorylaimopsis metatypicus*, *Sabatieria hilarula*, *Nygmatochus scriptus*, *Terschellingia* cf. *longicauda* and *Paramonhystra elliptica*.

R. W. Timm

1810—GERLACH, S. A., 1958. [Zoologisches Institut der Universität Kiel, West Germany.] "Freilebende Nematoden von den Korallenriffen des Roten Meeres." *Kieler Meeresforschungen*, 14 (2), 241-246.

Of 36 species of marine nematodes collected in the Red Sea on the Xarifa Expedition of 1957-58 four new species are here described and figured. *Selachinema xarifae* n.sp. differs from *S. ferox* in having only a single circle of reduced cephalic papillae. *Draconema spinicauda* n.sp. is distinguished from related species by the long tail tip. *Microlaimus affinis* n.sp. differs from *M. arenicola* and related species through the conical cephalic papillae and larger oesophageal bulb. *Euchromadora parafricana* n.sp. is nearest to *E. africana* but the spicules and cephalic setae are shorter.

R. W. Timm

1811—GERLACH, S. A., 1958. [Zoologisches Institut der Universität Kiel, West Germany.] "Deuxième contribution à la faune des nématodes des eaux interstitielles littorales de Madagascar." *Mémoires de l'Institut Scientifique de Madagascar. Série F. Oceanographie*, 2, 343-365.

A further collection of free-living marine nematodes from Madagascar is reported [for abstract of previous paper see Helm. Abs., 22, No. 851a]. *Trefusia cornea* n.sp. is distinguished from all other species by the relatively narrower body and shorter tail. *Enoplus sacculus* n.sp. is near to *E. brevis* but is much smaller, lacks anal setae, and the male has large amphids with sclerotized apertures. *Oncholaimus malgassus* n.sp. strongly resembles *O. campylocercoides* but the tail is much narrower and the pre-anal papilla less conspicuous. *Tripyloides brevis* n.sp. is distinguished by its short rounded tail and long cephalic setae. Other species described and figured include: *Enoplolaimus* cf. *littoralis*, *Mesacanthion* cf. *longispiculum*, *Anoplostoma* cf.

hirtum, *Nummocephalus* cf. *tautraensis*, *Draconema* cf. *solidum*, *Oncholaimus longispiculosus*, *Litinium aequale*, *Bathepsilonema pustulatum* and *Nannonchus amazonicus*. Slight morphological differences from the original descriptions of the first five of these species are noted.

R. W. Timm

- 1812—GERLACH, S. A., 1959. [Zoologisches Institut der Universität, Kiel, West Germany.] "Neue Meeres-Nematoden aus dem Supralitoral der deutschen Küsten." *Internationale Revue der Gesamten Hydrobiologie*, **44** (3), 463–467.

Four new species of free-living marine nematodes from the German coast of the North Sea are described and figured. *Halalaimus* (*Tyncnodora*) *terrestris* n.sp. differs from *H. longicaudatus* in the swollen tail tip, equally long cephalic setae and small size of the body. *Microlaimus citrus* n.sp. differs from all other species in the combination of cylindrical tail tip, papillate cephalic setae and thickened lining of the oesophageal bulb. *Leptolaimus puccinelliae* n.sp. is distinguished by its very long tail. *Theristus spirus* n.sp. is characterized by simple spicules without a gubernaculum and by the long tail.

R. W. Timm

- 1813—GUPTA, S. P., 1960. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Nematode parasites of vertebrates of East Pakistan. VII. *Capillaria copyschi* sp.nov." *Canadian Journal of Zoology*, **38** (5), 879–881.

Capillaria copyschi n.sp. is described from the small intestine of *Copyschus c. saularis* from East Pakistan. The species is characterized by the absence of lateral caudal alae, a smooth spicule sheath, undivided bursal papillae, in the spicules not being twisted, in the absence of long ridges on the eggs and in various other characters.

W. G. Inglis

- 1814—HARTWICH, G., 1960. [Zoologisches Museum d. Humbolt-Universität, Berlin N 4, Invalidenstrasse 43, Germany.] "Über *Megalobatrachonema terdentatum* (Linstow 1890) nov.comb. und die Stellung von *Megalobatrachonema* Yamaguti 1941 im System der Ascaridina (Nematoda)." *Zeitschrift für Parasitenkunde*, **19** (6), 606–616.

Oxysoma terdentatum Linstow, 1890 is redescribed from the type material and is referred to the genus *Megalobatrachonema* Yamaguti, 1941 as a new combination. The genus now contains three species, *M. nipponicum* Yamaguti, 1941 (type species); *M. campanae* Chabaud & Golvan, 1957 and *M. terdentatum*; *Chabaudgolvania* Freitas, 1958 is a synonym of *Megalobatrachonema*. The family Subulurascariidae Freitas & Dobbin, 1957 is accepted, with *Subulascaris* and *Megalobatrachonema*, as a family of the Cosmoceroidea.

W. G. Inglis

- 1815—HOPPER, B. E., 1960. [Nematology Section, Entomology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Canada.] "Contributions to the knowledge of the genus *Meloidodera* (Nematoda: Tylenchida), with a description of *M. charis* n.sp." *Canadian Journal of Zoology*, **38** (5), 939–947.

Hopper emends the characters of the genus *Meloidodera* Chitwood, Hannon & Esser, 1956. The description of *M. floridensis* Chitwood *et al.*, 1956 is amplified and includes details of females and larvae. Males are described for the first time; they differ from *Heterodera* and *Meloidogyne* males in their smaller body and shorter spicules and in having a constricted neck region. The lip region is divided into labial and post-labial annules without lateral cheeks. *Meloidodera charis* n.sp. is described and figured. Females differ from those of *M. floridensis* by being shorter and wider with a shorter stylet. The measurement of the stylet knobs and position of the dorsal gland orifice also differ. The larvae differ from those of *M. floridensis* in being shorter with a shorter stylet but with a longer stylet extension, also smaller phasmids. No males were found. The type host is *Prosopis juliflora* var. *glandulosa*.

D. J. Hooper

- 1816—INGLIS, W. G., 1959. [British Museum (Natural History), Cromwell Road, London, S.W.7, England.] "Some oxyurid parasites (Nematoda) from *Ochotona rufescens vizier* (Mammalia: Lagomorpha) in Iran." *Bulletin de la Société Zoologique de France*, **84** (2/3), 178–187.

Two new species of nematodes are described from *Ochotona rufescens vizier* in Iran. *Cephaluris chabaudi* n.sp. is characterized by the asymmetrical arrangement of the caudal papillae and the slight asymmetry of the tail itself. *Labiostrongylus akhtari* n.sp. is characterized by the unique distribution of the caudal papillae, which consist of one large post-cloacal quadruple papilla and six symmetrically arranged pairs of papillae. The head is described in detail for

both species. It is suggested that the genera *Labiostomum* Akhtar, 1941 and *Eugenuris* Shults, 1948 have been distinguished on differences due to the effect of fixation on the cephalic vesicle characteristic of *Labiostomum*. It is further pointed out that the species referred to the genus *Eugenuris* appear to be very similar to the species of *Labiostomum* and may be indistinguishable from them. *Eugenuris* is treated as a synonym of *Labiostomum* and the three species referred to that genus are now referred to *Labiostomum* as new combinations. This genus thus now contains six species but further examination may show that there are only three. W. G. Inglis

1817—INGLIS, W. G. & CHABAUD, A. G., 1960. [British Museum (Natural History), Cromwell Road, London, S.W.7, England.] "Sur la position systématique des Schneidernematinae (Nematoda)." *Annales de Parasitologie Humaine et Comparée*, **35** (3), 428–429.

Inglis & Chabaud describe the structure of the head in *Schneidernema retusa* (Rudolphi, 1819) and *Morgascaridia sellsi* (Morgan, 1927) and propose that the subfamily Schneidernematinae Freitas, 1956 be reinstated with two genera, *Schneidernema* Travassos, 1927 and *Morgascaridia* Inglis, 1958 and that it be included in the family Seuratidae Hall, 1916. The subfamily is characterized by a triradiate mouth with poorly developed lips, a simple oesophagus, a short tail, a pre-cloacal sucker on the male tail, a small gubernaculum, equal spicules and non-embryonate eggs. W. G. Inglis

1818—KANNAN, S., 1960. [Presidency College, Madras, India.] "Soil nematodes from Madras City." *Journal of the Zoological Society of India*, **12** (1), 40–50.

Five new species and one new variety are briefly described and figured; [the figures are not identified]. The species are: *Rhabditoides coprophaga longicaudatus* n.var. [*longicaudata*], *Bunonema madrasicum* n.sp., *Diploscapter orientalis* n.sp., *Cephalobus minor* n.sp., *Eucephalobus verrucosus* n.sp. and *Eucephalobus setensis* n.sp. No males of any species were recorded.

R. W. Timm

1819—KHALIL, L. F., 1960. [Department of Parasitology, London School of Hygiene & Tropical Medicine, London, W.C.1, England.] "On a new nematode, *Nilonema gymnarchi* gen. et sp.nov., (Dracunculidae), from a freshwater fish in the Sudan." *Journal of Helminthology*, **34** (1/2), 55–58.

Khalil describes *Nilonema gymnarchi* n.g., n.sp. (Dracunculidae) from five female specimens found in the lung-like air bladder of *Gymnarchus niloticus* in the Khartoum area of the Sudan. The new genus is characterized by the presence of cone-like cuticular structures on the dorsal and ventral sides of the body and by the lack of a swollen anterior part to the oesophagus. An oesophageal gland, vagina and vulva are lacking and the species is viviparous. W. G. Inglis

1820—LEIBERSPERGER, E., 1960. [Zoologisches Institut, Universität Erlangen, West Germany.] "Die Oxyuroidea der europäischen Arthropoden." *Parasitologische Schriftenreihe. Jena*, No. 11, 150 pp.

35 species of oxyuroids from 11 genera of Thelastomidae and one species from one genus of the Oxyuridae are known from Europe. Detailed morphological studies of 20 of these species revealed the tendency of the cheilostoms and telostoms to be reduced or strengthened, and the mesostoms and metastoms to fuse. The radii of the triradiate oesophageal lumen have many kinds of supporting elements. The valve apparatus consists of six primary and three secondary pieces. The arrangement of the mouth cavity, oesophagus and valve represents an older phylogenetic pattern that probably was unaltered in the Thelastomidae because of their parasitic habit. Larval characters are retained in the males. The number and arrangement of anal papillae permit generic recognition of the males. Embryonated eggs were infective only when the larvae reached the second or early third stage. Egg-shell ornamentation and the method of oviposition are correlated with the aquatic habit of the host. Predacious, phytophagous or carrion-feeding hosts are not infected by oxyuroids. Myriapoda and Orthoptera, older host groups, are infected. Hemimetabolous hosts are infected in nymphal and adult stages while holometabolous hosts are infected in one of the two stages. World records of Diplopoda and Insecta parasitized by oxyuroids are given. Keys are presented for the genera of the Thelastomidae and Oxyuridae, and the species of *Thelastoma*, *Johnstonia*, *Cephalobellus*, *Severianoia*, *Cameronia*, *Hammerschmidtella*, *Leidynema*, *Pseudonymus* and *Binema*.

Nine new species are proposed: *Thelastoma blabericola* n.sp. from *Blaberus cranifer* and *Blaptica dubia* in Germany; *T. periplaneticola* n.sp. from *Periplaneta americana* in Czechoslovakia; *T. rovinjense* n.sp. from *Pachyjulius fuscipes* in Yugoslavia; *Cephalobellus potosiae* n.sp. from *Potosia cuprea* in Germany; *C. osmodermæ* n.sp. from *Osmoderma eremita* and *Potosia aeruginosa* in Germany; *C. melolonthæ* n.sp. from *Melolontha* sp. in Germany; and *Cameronia multiovata* n.sp. and *Binema pseudornatum* n.sp., both from *Gryllotalpa gryllotalpa* in Germany. Differences in female tail structure of the new species, *Cephalobellus tipulae*, separate the five new subspecies, namely, *C. tipulae tipulae* n.subsp. from eight *Tipula* spp. and *Dictenidia bimaculata*, *C. tipulae lohmanderi* n.subsp. from *Glomeris marginata* in Denmark and Sweden, *C. tipulae glomeridis* n.subsp. from *G. conspersa*, *G. undulata* and *G. hexasticha* in Germany and Austria, *C. tipulae uncigeri* n.subsp. from *Cylindroiulus nitidus*, *C. teutonicus*, *Chromatoiulus projectus kochi*, *Tachypodoiulus albipes*, *Unciger foetidus*, *Leptophyllum nanum*, *Schizophyllum sabulosum* and *G. conspersa* in Sweden, Austria and Germany, and *C. tipulae lucani* n.subsp. from *Lucanus cervus* in Germany. Redescriptions and distributional and host observations are made on 27 known species.

H. E. Welch

- 1821—MARGOLIS, L., 1960. [Fisheries Research Board of Canada, Biological Station, Nanaimo, British Columbia, Canada.] "A new nematode of the genus *Cucullanus* (Camallanata: Cucullanidae) from a flounder, *Parophrys vetulus* Girard, 1854, with notes on the species from Pleuronectiformes." **Canadian Journal of Zoology**, 38 (5), 839-849.

Cucullanus annulatus n.sp. is described from the intestine of *Parophrys vetulus* Girard in the coastal waters of British Columbia and is characterized by fine, transverse, cuticular striations which become more prominent anteriorly and which finally produce prominent annulations which give the cuticle a serrated appearance. It is also characterized by a prominent anterior lip to the vulva. The species of *Cucullanus* reported from Pleuronectiformes are reviewed and *C. wilkeri* Kreis, 1952 is considered a synonym of *C. heterochrous* (Rudolphi, 1802).

W. G. Inglis

- 1822—MAWSON, P. M., 1960. "Seuratinema Johnston et Mawson 1941, synonyme de *Skrjabinema* [*Skrjabinura*] Gnédina 1933." **Annales de Parasitologie Humaine et Comparée**, 35 (3), 430-431.

A re-examination of the males of *Seuratinema brevicaudatum* and *S. pomatostomi* shows that they both have two spicules and a gubernaculum. As a result *Seuratinema* Johnston & Mawson, 1941 is a synonym of *Skrjabinura* Gnédina, 1933 and both the species of *Seuratinema* mentioned above, together with *Seuratinema magnum* are referred to *Skrjabinura*. [In this paper *Skrjabinema* is used in error for *Skrjabinura*. This is corrected in **Ann. Parasit. hum. comp.**, 35, p. 676.]

W. G. Inglis

- 1823—PELÁEZ, D. & PÉREZ-REYES, R., 1960. [Departamento de Parasitología, Escuela Nacional de Ciencias Biológicas, Instituto Politécnico, México, 17, D.F., Mexico.] "*Piratuba lanceolata* nov.sp. parásita de la lagartija *Sceloporus teapensis* Günther, 1890 (Nemat. Filar.)." **Revista Latinoamericana de Microbiología**, México, 3 (2), 67-73. [English summary p. 73.]

Piratuba lanceolata n.sp. is described from the peritoneal cavity of *Sceloporus teapensis* in Mexico. The morphology of the adult and the microfilaria is described and the species is characterized by a marked difference in the size of the sexes (male 19.64 mm. long, female 30.54 mm. long), 15 pairs of caudal papillae with a characteristic distribution on the male tail, the shape of the spicules and the great length of the oesophagus in the female. W. G. Inglis

- 1824—PIGOLKIN, A. U., 1958. [Dalnevostochnii filial Sibirskogo otdeleniya Akademii nauk SSSR, U.S.S.R.] [*Capillaria suis* n.sp.—a new nematode from *Sus scrofa* from the Russian Far East.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 261-262. [In Russian.]

Capillaria suis n.sp., from the small intestine of a wild boar in the Maritime Territory, is nearest to *C. bovis* but differs from it in the structure of the male tail, the short spicules (0.54 mm.), the absence of cuticular structures around the vulva and the eggs which are drawn out at the poles and are 0.060 mm. to 0.068 mm. long. This is a first record of *Capillaria* from pigs.

G. I. Pozniak

1825—POLOZHENTSEV, P. A. & ARTYUKHOVSKI, A. K., 1958. [Voronezhski lesotekhnicheski institut, U.S.S.R.] [Revision of the classification of Mermithidae Braun, 1883.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 271–273. [In Russian.]

Reviewing *Paramermis* (a revision of *Mermis* is to be published in **Zapiski Voronezhskogo Gosudarstvennogo Pedagogicheskogo Instituta**), the authors list the following species in the genus; *P. crassa*, *P. contorta*, *P. limnophila* and *P. lepnevae*; the first two species require further study. *P. fluviatilis* they transfer to *Limnomermis* and discuss another seven species at one time in *Paramermis* but since included in other genera. [See also Helm. Abs., 28, No. 79g.] G. I. Pozniak

1826—RIZHIKOV, K. M. & ROMANOVA, N. P., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR, Moscow.] [*Paramidostomum skryabini* n.sp. from anseriform birds in the Moscow Zoological Gardens.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 306–309. [In Russian.]

Paramidostomum skryabini n.sp. is described and figured from *Branta ruficollis* and *Anser albifrons* in the Moscow Zoo. Although *P. skryabini* shows some features of *Amidostomum*, i.e. teeth at the base of the buccal capsule and hosts, it is placed in *Paramidostomum* on the structure of the spicules which are little chitinized and not branched at the distal ends. It further resembles the only species in the genus, *P. pulchrum*, in having both longitudinal and transverse striations on the body, but differs in the presence of the buccal teeth, the absence of a subcuticular thickening on the head end and in the longer spicules (0.145 mm. long). The authors indicate that *B. ruficollis* may not be the typical host of *P. skryabini*. G. I. Pozniak

1827—RUIZ, J. M. & COELHO, E., 1957. [Secção de Parasitologia, Instituto Butantan, Caixa Postal 65, São Paulo, Brazil.] “Nematóides (Oxyuroidea) parasitos de diplópodos da Ilha da Queimada Grande, São Paulo, Brasil.” **Memorias do Instituto Butantan**, Year 1955–56, 27, 51–66. [English summary p. 61.]

Ruiz & Coelho describe two new varieties and one new species of oxyuroid parasites from the intestine of the diplopod *Neptunobolus hoguei* in Brazil. *Aorurus agilis* var. *insularis* n.var. (male unknown) differs from *A. agilis* as described by Christie in having a more posteriorly situated excretory pore (at the level of the intestinal dilatation) and in having a shorter vagina with a relatively longer muscular portion. *Thelastoma bulhøesi* var. *dollfusi* n.var. from the diplopods *N. hoguei* and *Gymnostreptus* sp. [redescribed by Dollfus in 1952 in **Ann. Parasit. hum. comp.**, 27, pp. 143–236] differs from *T. bulhøesi* as originally described from *Periplaneta* (Blattidae) in having a longer oesophagus, the excretory pore in front of the level of the oesophageal isthmus and the number of cuticular rings between different points. *Dudekenia insularis* n.sp. from *N. hoguei* is very close to *D. brevicaudata* so that the females of the two species are difficult to distinguish from each other; the males differ in that *D. insularis* has four pre-anal, one ad-anal and four post-anal pairs of caudal papillae and that its spicules have blunter points and do not have a region presenting a hammered appearance [like beaten copper—see original illustration by Artigas, 1930 in **Mem. Inst. Osw. Cruz**, 24, pp. 19–30]. W. M. Fitzsimmons

1828—SANWAL, K. C., 1960. [Nematology Section, Entomology Research Institute, Department of Agriculture, Ottawa, Canada.] “*Panagrellus dubius* n.sp. (Nematoda: Turbatricinae Goodey, 1943), from frass of beetle *Sternochetus lapathi* (L.), with remarks on redescrptions of *Anguillula rediviva* (L., 1767).” **Canadian Journal of Zoology**, 38 (6), 1041–1046.

The longer prongs of the bifurcated spicules and the presence of a lightly sclerotized supporting core in the vellum of each spicule characterizes *Panagrellus dubius* n.sp. collected from the frass of *Sternochetus lapathi* at Victoria, British Columbia. *P. dubius* is compared with each of the redescrptions of *Anguillula rediviva* by Rühm (1956) and by Goodey (1922), each of which, Sanwal considers, redescribed separate species. Rühm's synonymy (1956) of *P. pycnus* Thorne, 1938, *P. leucocephalus* (Steiner, 1936) Goodey, 1945 and *P. silusiae* (de Man, 1913) Goodey, 1945 with *A. rediviva* is rejected. H. E. Welch

- 1829—SANWAL, K. C., 1960. [Nematology Section, Entomology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Canada.] "*Macrolaimus canadensis* n.sp. (Nematoda: Panagrolaiminae), from the frass of the bark beetle *Phloeosinus canadensis* Swaine, 1917, with remarks on other species of the genus *Macrolaimus* Maupas, 1900." **Canadian Journal of Zoology**, **38** (6), 1127–1131.

A small, thorn-like ventral spine on the spicules, and the possession of stouter cheilorhabdions distinguishes *Macrolaimus canadensis* n.sp. collected from frass of *Phloeosinus canadensis*, in white cedar at Lac Tremblant, Quebec. *M. aculeatus* (Daday, 1905) Thorne, 1937, and *M. citri* Rahm, 1928, are regarded as *species inquirendae*. Sanwal rejects Rühm's synonymy (1956) of *M. hamatus* Thorne, 1937, *M. crucis* of Fuchs, 1938, *M. crucis* Maupas, 1900, and the *M. crucis* of Rühm, 1956, and accepts each as separate species, although the status of *M. crucis* of Fuchs is questionable. The new combination, *Myolaimus maupasi* (Hnatewytch, 1929), is proposed. H. E. Welch

- 1830—SHIGIN, A. A. & SHIGINA, N. G., 1958. [A new parasite of tench, *Skrjabillanus tincae* n.g., n.sp. (Nematoda: Camallanata).] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 395–399. [In Russian.]

Skrjabillanus tincae n.g., n.sp., from under the serous kidney membrane of *Tinca tinca* from the Volga and the Rybinsk Reservoir, is described and figured. The new form has a filiform body and therefore belongs in the Dracunculoidea where it is placed in Skrjabillanidae n.fam. The new family in possessing a well developed stoma is near to Anguillicolidae but differs from it in the presence of caudal alae in the male and the anterior position of the vulva.

G. I. Pozniak

- 1831—SINHA, P. K., 1960. [Bengal Veterinary College, Calcutta, India.] "*Syphacia srivastavi* n.sp. from domestic pig in India." **Journal of Parasitology**, **46** (4), 505–508.

Sinha describes *Syphacia srivastavi* n.sp. on the basis of female specimens obtained from the domestic pig at Bareilly, India. The species is considered distinct in the small size of the eggs which are 0.049 mm. by 0.027 mm. in size, the form of the anterior end of the body which bears a cephalic vesicle, the absence of oesophageal teeth and by the relative lengths of various organ systems.

W. G. Inglis

- 1832—SOBOLEV, A. A., 1958. [Dalnevostochnii gosudarstvenni universitet, U.S.S.R.] [On the systematics and morphology of physalopterids (Nematoda: Spirurata).] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 345–348. [In Russian.]

Commenting on two papers by Chabaud [for abstracts see Helm. Abs., **25**, Nos. 55d and 200a] Sobolev agrees with him that the parasites described from *Citellus citellus* in Czechoslovakia belong in Physalopterata but considers that there is not sufficient basis for and consequently rejects the synonymization of Pentadentoptera with Physalopterata. He also points out the differences between Chabaud's system for the orientation of head teeth in reptilian physalopterids and the system used in Volume I of Skryabin's Descriptive Catalogue of Parasitic Nematodes.

G. I. Pozniak

- 1833—TARJAN, A. C., 1960. [Citrus Experiment Station, University of Florida, Lake Alfred, Florida, U.S.A.] "A review of the genus *Paratylenchus* Micoletzky, 1922 (Paratylenchinae: Nematoda) with a description of two new species." **Annals of the New York Academy of Sciences**, **84**, 329–390.

In his review of the genus *Paratylenchus*, Tarjan designates *Tylenchus macrophallus* de Man, 1880 *incertae sedis* making *P. bukowinensis* Micoletzky, 1922 the genotype. *Hemicyclophora strenzkei* Volz, 1951 is termed *incertae sedis* and *Paratylenchus anceps* Cobb, 1923 is placed in *species inquirendae*. *P. minutus* Linford in Linford, Oliveira & Ishii, 1949 is made a synonym of *P. elachistus* Steiner, 1949, and *P. dianthus* Jenkins & Taylor, 1956 a synonym of *P. curvatus* van der Linde, 1938. Descriptions and drawings are given of the above species and of 16

species left in the genus including *P. sarissus* n.sp. and *P. minusculus* n.sp. *P. sarissus* is characterized by its long stylet (56μ), female tail shape and general body proportions, $L=321\mu$, $a=21.4$, $b=3.3$, $c=12.9$, $V=82\%$. *P. minusculus* is distinguished by the anterior position of the vulva (74%), short body length (237μ), long tail, $c=10.6$ and short stylet (25μ). The male oesophagus and stylet are degenerate for both of these new species. The male of *P. projectus* Jenkins, 1956 is also described. D. J. Hooper

1834—TRACH, V. N., 1957. [The systematics of the genus *Ostertagia* Ransom, 1907.] *Zbirnik Prats Zoologichnogo Muzeiu. Institut Zoologii, Akademiya Nauk Ukrainskoi SSR*, No. 28, pp. 108–115. [In Ukrainian: Russian summary pp. 114–115.]

On helminthological examination of sheep in the Kiev region several types of strongylate females were found. Some of them have already been described by Gushanskaya & Krukova (1930) as *Ostertagia* (O.) sp. No. 1, *Ostertagia* (O.) sp. No. 4 and *O. (O.) occidentalis*, and by Tomskikh (1939) as *O. volegensis*. Others are now described by Trach as *Ostertagia* sp. No. 0/2, No. 0/3, No. 0/4 and No. 0/7. From a systematic study of females of *Ostertagia*, Trach concludes that they do not represent individual species but are interspecific variations of *O. circumcincta*, *O. trifurcata* and, possibly, *O. ostertagi*. The shape and size of cuticular and other structures around the vulva are variable and unsuitable for specific differentiation; in other features such as the head and tail structure, sex apparatus and distribution of neck papillae the females vary only little. Identification of these species must therefore be made on the males. G. I. Pozniak

1835—TRAVASSOS, L. & KLOSS, G. R., 1958. [Instituto Oswaldo Cruz, Rio de Janeiro, Brazil.] “Sobre a fauna de nematodeos dos coleópteros-Passalidae da Estação Biológica de Boracéia.” *Arquivos de Zoologia do Estado de São Paulo*, 11 (2), 23–57.

A list of 44 species from 15 genera of oxyuroids parasitic in the gut of beetles of the Passalidae is based on a review of the literature, and material collected in Brazil, particularly at the Boracéia Biological Station in April, 1957. Nine new genera are named: *Salesia* n.g. based on *S. alata* n.sp. from *Veturius cephalotes*; *Urbanonema* n.g. based on *U. helgae* n.sp. from *V. cephalotes* at São Sebastiao Is.; *Paraxyo* n.g. based on *P. monodelpho* n.sp. from *V. cephalotes* and *Passalus mancus*; *Vulcanonema* n.g. based on *V. martinezi* (Travassos & Kloss, 1957) n.comb., and including *V. ovicarenata* (Travassos & Kloss, 1957) n.comb.; *Glaber* n.g. based on *G. coronata* (Travassos & Kloss, 1957) n.comb., and including *G. ? inermis* (Artigas, 1926) n.comb. and *G. ? politus* (Artigas, 1928) n.comb.; *Soaresnema* n.g. based on *S. soaresi* n.sp. from *P. mancus*; *Boraceianema* n.g. based on *B. boraceia* n.sp. from *P. mancus*; *Mentecle* n.g. based on *M. paulista* n.sp. from *Passalus anguliferus*, and including *M. parvus* n.sp. from *P. morio* from Cacoia, Sto. Amaro; *Longior* n.g. based on *L. longicollis* (Artigas, 1926) n.comb. from *Passalus* spp. in various locales, and including *L. macrovata* (Travassos & Kloss, 1957) n.comb. and *L. pulchra* n.sp. from *P. mancus*. Other new species include: *Hystrignathus pearsoni* n.sp. from *P. anguliferus*; *H. rugosus* n.sp. from *P. mancus*; *H. rescens* n.sp. from *P. alias*; *Xyo pseudohistrix*, a new name for *H. histrix* Christie, 1934; *X. sebastianensis* n.sp. from *P. quadricollis* at São Sebastiao Is.; *Artigasina insignia* n.sp. from *P. anguliferus*; *A. silvestris* n.sp. from *V. cephalotes*. All new species are from Boracéia unless stated otherwise. The eighth new combination is *H. tarda* (Artigas, 1926). Hystrignathidae n.fam. is proposed for the subfamily Hystrignathinae, which includes *Hystrignathus*, *Xyo*, *Urbanonema*, *Artigasina*, *Paraxyo*, *Vulcanonema* and *Glaber*, and the new subfamily, Christiellinae, which includes *Christiella*, *Soaresnema*, *Boraceianema*, *Mentecle* and *Longior*. *Salesia* is included with *Lepidonema* and *Carlosia* in the Lepidonematidae. There is a key to genera and notes on synonymy, hosts and distributions of each species. H. E. Welch

1836—WAHID, S., 1961. [London School of Hygiene & Tropical Medicine, Department of Parasitology, London, W.C.1, U.K.] “Two hitherto undescribed species of *Enterobius* from a Colobus monkey.” [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (1), 11.

1837—WETZEL, R. & FORTMEYER, H. P., 1960. [Parasitologisches Institut der Justus Liebig-Universität, Frankfurterstrasse 94, Giessen, West Germany.] "Zur Kenntnis von *Impalaia tuberculata* Mönnig 1924." *Zeitschrift für Parasitenkunde*, **20** (2), 138–145.

Third-stage larvae were obtained by culture of faeces of the gerenuk (*Lithocranius walleri*) and a goat kid was successfully infected. The resulting adult worms, their eggs and infective larvae are described in detail and identified as *Impalaia tuberculata* var. *longispiculata* n.var. Its spicule length is between 838μ to $1,202\mu$, average $1,075\mu$ and in this respect it differs from *I. tuberculata* Mönnig, 1924 (spicule length 600μ) which it otherwise resembles very closely. The third-stage larvae show distinctive characters which permit an unequivocal determination of *Impalaia* infections; they differ from other stronglylid infective larvae in that at the anterior end of the oesophagus the wall is bulbous and bears, dorsally and ventrally, a rounded, dark brown, flattened structure about 7μ long seen as two elongated ovals when viewed laterally and in that they have a trifurcate caudal extremity. The prepatent period is 16 days. *Lithocranius walleri* is a new natural host record and *Capra hircus* a new experimental host record for *I. tuberculata*.
W. M. Fitzsimmons

1838—WU, L. Y., 1960. [Nematology Section, Entomology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Canada.] "*Criconema celetum* n.sp. (Nematoda: Criconematidae) from African violets in Canada." *Canadian Journal of Zoology*, **38** (5), 913–916.

Wu describes and figures *Criconema celetum* n.sp. from *Saintpaulia* sp. in Quebec. The body has 40 to 43 annules, each with a row of spines except at the caudal end. The head consists of two annules with spines, the first annule having a slightly wider diameter than the second. It is close to *C. multisquamatum* and *C. fimbriatum*; from the former it differs by having only two head annules each with spines and from the latter in having fewer body annules, each annule with more spines; the tail shape is also different. It differs from both of these species in that the caudal annules having spatulate projections each with several spines. D. J. Hooper

1839—YEH, L. S., 1960. [Department of Parasitology, London School of Hygiene & Tropical Medicine, London, W.C.1, England.] "On *Camallanus johnei* sp.nov., collected from *Xenopus* in Tanganyika Territory." *Journal of Helminthology*, **34** (1/2), 103–106.

Camallanus johnei n.sp. is described from the intestine of *Xenopus* sp. at Mwanza, Tanganyika. The species is characterized by the very unequal spicules, the right being 0.29 mm. and the left 0.04 mm., and the unequally developed tridents and by having its greatest width at the level of the excretory pore.
W. G. Inglis

1840—YEH, L. S., 1960. [Department of Parasitology, London School of Hygiene & Tropical Medicine, London, W.C.1, England.] "On a collection of camallanid nematodes from freshwater fishes in Ceylon." *Journal of Helminthology*, **34** (1/2), 107–116.

Yeh reports five species of camallanid nematodes from fresh-water fish in Ceylon, three of them new. Four of them are referred to *Zeylanema* n.g., which is characterized by the longitudinal ridges of the buccal valves bearing teeth and by the spicules which are very unequal in length. *Z. anabantis* (Pearse, 1933 in part) n.comb. is the type species and is redescribed and Yeh points out that the original description must have been based on two species and he has "... taken the liberty to select the descriptions of the male as given by Pearse to be the type description". *Z. pearsi* n.sp., for *Camallanus anabantis* Pearse, 1933 in part, is based on two female specimens from *Rasbora daniconius* and is characterized by the lack of tridents and the presence of seven rows of teeth on each buccal valve—the female described by Pearse as *C. anabantis* is considered to be referable to this species. *Z. kulasirii* n.sp. is described from *Ophicephalus punctatus* (type host) and *Anabas testudineus* and from males only—it is characterized by vestigial tridents. *Z. fernandoi* n.sp. from *Ophicephalus punctatus* (type host) and *O. striatus* is characterized by a single posterior tooth on each of the seven ridges of the buccal valves and by a pair of well developed tridents. *Procamallanus spiculogubernaculus* Agarwal, 1958 is reported from *Clarias batrachus*.
W. G. Inglis

1841—YEH, L. S., 1960. [Department of Parasitology, London School of Hygiene & Tropical Medicine, London, W.C.1, England.] "On a reconstruction of the genus *Camallanus* Railliet and Henry, 1915." *Journal of Helminthology*, **34** (1/2), 117–124.

The family Camallanidae is divided into two subfamilies Camallaninae Railliet & Henry, 1915 and Procamallaninae n.subf. The first is characterized by a continuous buccal capsule, with or without thickenings and by lacking tridents while the second is characterized by a slit-like mouth opening, a buccal capsule with two lateral valves and by tridents being present or absent. Procamallaninae contains two genera *Procamallanus* Baylis, 1923 and *Spirocamallanus* Olsen, 1952. Camallaninae contains six genera, *Paracamallanus* Yorke & Maplestone, 1926; *Camallanides* Baylis & Daubney, 1922; *Zeylanema* Yeh, 1960; *Piscilania* n.g.; *Serpinema* n.g.; *Camallanus* Railliet & Henry, 1915. *Piscilania* contains only one species *P. melanocephalus* (Rudolphi, 1819) n.comb., and is characterized by a buccal capsule with internal longitudinal thickenings which are short anteriorly and spine-like in the posterior part; *Serpinema* contains ten species of which *S. intermedius* (Hsu & Hoeppli, 1931) n.comb. is the type species and the genus is characterized by smooth buccal thickenings separated into dorsal and ventral groups. The other species are: *S. amazonicus* (Ribeiro, 1941); *S. kachugae* (Baylis & Daubney, 1922); *S. magathi* (Sprehn, 1932); *S. magnorugosus* (Caballero, 1939); *S. microcephalus* (Dujardin, 1845); *S. octorugatus* (Baylis, 1933); *S. pychozondis* (MacCallum, 1918); *S. trispinosus* (Leidy, 1851) and *S. undulatus* (Railliet & Henry, 1915). Twenty-three species are referred to *Camallanus* and six to *Zeylanema*, in addition to the species referred to the genus in the immediately preceding paper [see abstract No. 1840 above]. Yeh includes *Z. atridentus* (Khera, 1954) and *Z. sweeti* (Moorthy, 1937). He also discusses the characters of value in delimiting species within the subfamily Camallaninae and gives a key to the genera of the family Camallanidae.

W. G. Inglis

1842—YEH, L. S., 1960. [Department of Parasitology, London School of Hygiene & Tropical Medicine, London, W.C.1, England.] "On a new filarioid worm, *Edesonfilaria malayensis* gen. et sp.nov. from the long-tailed macaque (*Macaca irus*)." *Journal of Helminthology*, **34** (1/2), 125–128.

Edesonfilaria malayensis n.g., n.sp. is described from the peritoneal cavity of *Macaca irus* in Malaya. Further specimens were obtained from the same host in several laboratories using monkeys from Malaya and Siam. The genus is characterized by well developed caudal alae, a short hooked right spicule and a very long left spicule.

W. G. Inglis

Nematomorpha

1843—KIRYANOVA, E. S., 1958. [Zoologicheskii institut, Akademiya nauk SSSR, Moscow.] [*Spinichordodes skryabin* n.sp. (Nematomorpha, Gordiidea) from the Armenian S.S.R.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 152–157. [In Russian.]

Kiryanova describes and figures *Spinichordodes skryabin* n.sp. which was found in a small irrigation ditch in Armenia. *S. skryabin* differs from the known species in the genus by the head end which narrows sharply; in the structure of the areolae it is nearest to *S. baeri*. The animal host is unknown.

G. I. Pozniak

Hirudinea

1844—EPSHTEIN, V. M., 1959. [Kharkovski zootekhnicheskii institut, U.S.S.R.] [The taxonomic position, mode of life and origin of the leech *Trachelobdella torquata* (Grube) endemic in Lake Baykal.] *Dokladi Akademii Nauk SSSR*, **125** (4), 935–937. [In Russian.]

A detailed examination and description of *Piscicola torquata* leads Ephstein to conclude that this leech belongs in the genus *Trachelobdella*. He also shows that *Baicalobdella cottidarum* Dogel, 1957 (*Trudi Baikalskoi Limnologicheskoi Stantsii*, Vol. 15), is a synonym of *T. torquata* and disagrees with Dogel that this species warrants a separate genus. *T. torquata* is wide-spread and numerous in the littoral zone of Lake Baykal. It is found on stones 3 m. to 6 m. deep, and parasitic on the crustacean *Eulimnogammarus verrucosus* and the fish *Cotto-mephorus grewingki* (as reported also by Dogel) and *Batrachocottus* sp. In laboratory conditions it attacked *Paracottus kessleri*.

G. I. Pozniak

Miscellaneous

- 1845—BELOPOLSKAYA, M. M., 1958. [Leningradski gosudarstvenni universitet, Leningrad, U.S.S.R.] [New species of helminths from Charadriiformes.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 63–68. [In Russian.]

Four new intestinal helminths are described and figured from Charadriiformes caught on the islands and shores of the Barents Sea and Sea of Japan. The lecithodendriid *Atriotrema lecitholaterale* n.g., n.sp., from *Squatarola squatarola*, is placed in Allassogonoporinae due to the absence of a bursa and differs from its other two genera by the position of the genital pore which deviates slightly from the midline, by the narrow and deep genital atrium and the lateral vitellaria. *Levenseniella fissicotyle* n.sp. from *Arenaria interpres* and *Calidris maritima*, is characterized by the oral sucker, which is open on the ventral side and is twice as large as the ventral sucker, and the vitellaria which are composed of numerous small follicles. *L. microovata* n.sp., from *Tringa incana* and *Crocethia alba*, differs from other species in the genus, except *L. howensis*, by its small eggs (not more than 0.012 mm. long), and from *L. howensis* in the size of the oral and ventral suckers (0.128 mm. \times 0.107 mm. and 0.098 mm. \times 0.093 mm.) and the vitelline follicles which lie in two groups behind the testes. *Trichocephaloides temminckii* n.sp., from *Calidris temminckii*, is similar to *T. birostratus* in having the proboscis split in two, but differs from it in the short, wide proglottides and the hooks, which are 16 in number (in two groups of eight), measure 0.055 mm. and have a well developed guard and the blade longer than the handle. Morphological differences between these two species are tabulated.

G. I. Pozniak

- 1846—CHIBICHENKO, N. T., 1958. [Institut zoologii i parazitologii, Akademiya nauk Kirgizskoi SSR, U.S.S.R.] [The helminth fauna of *Bubo bubo* in Kirgiz S.S.R.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 380–383. [In Russian.]

The following helminths are recorded from *Bubo bubo* in Kirgizia: *Anomotaenia mollis*, *Tetrameres* sp., *Microtetrameres bubo* (the one male found is described as it differed in measurements from Schell's description), *Cheilospirura* sp., *Synhimantus laticeps*, *Habronema* sp. (the one male found in the muscular stomach differed from all the known species of the genus and is described), *H. mansonii* and *Brachylecithum bubo* n.sp. The new species is nearest to *B. filum* and *B. nigurica* but differs from these in the larger testes (0.30 mm. \times 0.32 mm. and 0.32 mm. \times 0.38 mm.), from *B. filum* also in the vitellaria (which extend over only 0.50 mm. to 0.54 mm.) and the smaller eggs (0.036 mm. to 0.040 mm. \times 0.018 mm. to 0.020 mm.), and from *B. nigurica* by the larger body (5.5 mm. to 6.0 mm. \times 0.46 mm.), ventral sucker (0.40 mm. \times 0.36 mm.) and ovary (0.18 mm. \times 0.20 mm.).

G. I. Pozniak

- 1847—GINETSINSKAYA, T. A. & NAUMOV, D. V., 1958. [Leningradski gosudarstvenni universitet, Leningrad, U.S.S.R.] [The helminth fauna of some species of Charadriiformes in the White Sea.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 99–108. [In Russian.]

Thirteen trematode, nine cestode, two nematode and one acanthocephalan species are listed from Charadriiformes (five species) in the Kandalaksha area of the White Sea. The following species are described: *Anomotaenia* sp. (probably *A. citrus* but the absence of scolex hooks prevented definite diagnosis), *A. clavigera* and *A. skrjabini* n.sp. from *Arenaria interpres*, and *Notocotylus marinus* n.sp. from *Haematopus ostralegus*. *Anomotaenia skrjabini* differs from the nearest species *A. clavigera*, with which it is usually found, by having not more than six to eight testes per segment while *A. clavigera* has 10–12 to 30, by the cirrus bursa which reaches beyond the poral caeca, by the ovary which has four to five deep lobes, and by the almost square, rather than oval, uterus. *N. marinus* differs from all known species in the genus in the genital bursa which extends to or beyond a point half-way along the body and is twice as long as the uterus; the length of the metraterm is two-thirds that of the bursa. Only *N. chionis* has similar relative measurements and from this *N. marinus* is differentiated by being smaller (1.84 mm.) and having few ventral glands which are not well developed.

G. I. Pozniak

INVERTEBRATE INTERMEDIATE HOSTS

Arthropoda

1848—BAISAS, F. E., 1957. [Institute of Malariology, Public Health Research Laboratories, Department of Health, Manila.] "Notes on Philippine mosquitoes, XIX. The mosquito problem in the control of filariasis in Sorsogon Province." **Philippine Journal of Science**, 86 (1), 71-120.

The transmission of filariasis by, and the D.D.T. resistance of several species of mosquitoes in the Philippines are discussed by Baisas. Third-stage microfilariae were found in 21 of 1,394 *Culex fatigans*. Results of the examination of 12,758 inhabitants of all ages for filariasis are tabulated.

J. W. Smith

1849—KERSHAW, W. E., EDESON, J. F. B. & JOHNSON, M. A., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] "The intake of *Brugia malayi* by different strains of *Aedes aegypti*." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 55 (1), 1.

1850—KRISHNASWAMI, A. K., KRISHNAN, K. S., RAGHAVAN, N. G. S. & BHATNAGAR, V. N., 1959. [Filaria Section, Malaria Institute of India, Delhi, India.] "Studies in transmission of filariasis. I. Effect of *D. repens* infection on the longevity of *Aedes aegypti*." **Bulletin of the National Society of India for Malaria and other Mosquito-Borne Diseases**, 7 (3), 95-101.

Krishnaswami *et al.* fed *Aedes aegypti* on dogs infected with *Dirofilaria repens* and compared the subsequent mortality rates of these mosquitoes with those fed on uninfected dogs. The mortality rate was highest during the first five days following infection irrespective of the microfilarial density of the blood on which they were fed, but within this period higher rates of mortality were observed with increasing microfilarial density. Mosquitoes fed on uninfected dogs showed a low mortality rate up to 15 days after infection after which time mortality increased. The high initial mortality of infected mosquitoes is probably due to the migration of microfilariae from the mid-gut to the Malpighian tubules.

J. W. Smith

1851—LACOUR, M. & RAGEAU, J., 1957. "Enquête épidémiologique et entomologique sur la filariose de Bancroft en Nouvelle-Calédonie et Dépendances." **Nouméa, New Caledonia: South Pacific Commission, Technical Paper No. 110**, 24 pp.

In New Caledonia and its dependencies where neither *Anopheles* nor *Aedes* (*Stegomyia*) of the group "*scutellaris*" occurs, *Aedes vigilax* is definitely the vector of human filariasis. 25 out of 1,109 dissected specimens contained filarial larvae and in centres of human filariasis the rate averaged 2.38% and exceptionally 8%. The microfilariae observed in the blood were morphologically identical with those of *Wuchereria bancrofti* but were non-periodic.

R. T. Leiper

1852—LEWIS, D. J. & GARNHAM, P. C. C., 1960. [Medical Research Council, London, England.] "The Simuliidae (Diptera) of British Honduras." **Bulletin of Entomological Research**, 50 (4), 703-710.

1853—NAGATOMO, I., 1960. [Department of Medical Zoology, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] "Epidemiology and control of bancroftian filariasis in some villages of Nagasaki Prefecture. 2. Nocturnal feeding activities of mosquitoes in a filaria endemic section, Kamisikama of Nanatugama village." **Endemic Diseases Bulletin of Nagasaki University**, 2 (4), 307-320.

A mosquito survey was made in Kamisikama, a filaria endemic section of Nanatugama village, Nagasaki Prefecture, to ascertain the hourly changes and seasonal distribution of the nocturnal feeding habits, host preference and house-abiding habits of the prevalent mosquitoes. All night collections were made in a cow-shed, a 30-minute catch at night in a young men's club-house and 20 to 40-minute morning catches in three farm-houses. Ten species occurred in the area but only two were abundant, viz., *Anopheles hyrcanus sinensis* and *Culex pipiens pallens*. The former was very prevalent in the cow-shed, feeding actively from 8.0 p.m. to 12.0 p.m. from early June to early July and was obviously zoophilic while the latter was chiefly found in houses

and in young men's clubs, being abundant from late June to early August and was extremely androphilic. Its house-frequenting habit and nocturnal feeding activity agree with the nocturnal periodicity of the microfilaria in the human population. R. T. Leiper

1854—POLOZHENTSEV, P. A. & NEGROBOV, V. P., 1958. [Voronezski lesotekhnicheski institut, U.S.S.R.] [A study of insects as intermediate hosts of helminths in the Voronezh region.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 274–278. [In Russian.]

Helminth larvae were found in 40 out of about 100 insect species, belonging to 15 orders and to about 80 different genera. These are listed with the larvae found in them. N. Jones

1855—ROOK, H. DE, 1957. [Netherlands New Guinea Petroleum Company, Sorong, Netherlands New Guinea.] "Report of an investigation on filariasis in the Berau region (Inanwatan district, north-west New Guinea)." **Nouméa, New Caledonia: South Pacific Commission, Technical Paper No. 105, v + 19 pp.** [Mimeographed.]

An investigation on the vectors of filariasis carried out during 1955 showed that although *Anopheles* species are absent, elephantiasis is common in the six villages situated in a large fresh-water swamp, the Telaga Kokoda, in the Berau region in north-western New Guinea. The filarial infection is the nocturnal type of *Wuchereria bancrofti*. The local vectors are *Culex bitaeniorhynchus*, *C. annulirostris* and *Mansonioides uniformis*. Between 19% and 26% of these culicines were found to be naturally infected and under experimental conditions the infection ranged from 73% to 94% and in all these species proceeded to the infective larval stage.

R. T. Leiper

1856—SHTEIN, G. A., 1958. [Laboratoriya zoologii bezpozvonochnikh, Leningradski gosudarstvenni universitet, U.S.S.R.] [The parasite fauna of aquatic arthropods in some lakes of the Karelo-Finnish A.S.S.R.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 407–410. [In Russian.]

One of 2,399 *Gammarus pulex* was infected with cysticercoids (100 specimens), which resembled in the form and the size of hooks those of *Hymenolepis abortiva*. Cysticercoids, resembling those of *H. microsoma* were found in one of 3,662 *Pallasea quadrispinosa*. Both parasites are described and illustrated.

N. Jones

1857—SYMES, C. B., 1960. [Filariasis Research Unit, Fiji.] "A note on *Dirofilaria immitis* and its vectors in Fiji." **Journal of Helminthology**, 34 (1/2), 39–42.

Culex annulirostris, *C. fatigans*, *Aedes aegypti*, *A. fijiensis*, *A. pseudoscutellaris* and *A. vexans* were fed on dogs infected with *Dirofilaria immitis* in Fiji. Great numbers of mosquitoes died before dissection. Third-stage larvae were observed in all the species and mature infections were produced in the proboscis of *C. fatigans*, *C. annulirostris* and *A. aegypti* on the 13th day, on the 13th to 17th day and on the 15th day respectively.

N. Jones

Mollusca

1858—BARBOSA, F. S., 1960. [Centro de Pesquisas Aggeu Magalhães, Recife, Pernambuco, Brazil.] "Proven and potential vectors of the trematode *Schistosoma mansoni* in South America." **Revista Brasileira de Biologia**, 20 (2), 183–190.

*1859—CASTILLO, J. DEL, 1958. "Rôle des mollusques dans la transmission des helminthoses des animaux domestiques. Incidences étiologiques et épizootologiques, conséquences prophylactiques." **Thesis, Lyons**, 104 pp.

1860—GILLET, J., BRUAUX, P. & WOLFS, J., 1960. [Service de l'Hygiène de Bukavu (Kivu), Congo.] "Résultats de prospections malacologiques en profondeur au lac Kivu et recherches sur la survie de *Biomphalaria* en eau profonde." **Annales de la Société Belge de Médecine Tropicale**, 40 (4), 643–649. [English, German, Spanish & Flemish summaries p. 649.]

Application of molluscicides and removal of vegetation to a depth of one metre resulted in a reduction of incidence of *Biomphalaria* to nil in its normal shallow habitat in Lake Kivu. A belt of weed remained from a depth of one to 2.5 m. to 3 m.; many partially petrified

Biomphalaria were recovered from this belt but never a living specimen. A table gives minimum and maximum depths at which different species were collected over 11 months, thus *Biomphalaria pfeifferi* 1 and 40 cm., *Bulinus coulboisi* 1 and 270 cm., *Bithynia alberti* 2 and 300 cm., *Gyraulus natalensis* 1 and 245 cm., *Lymnaea natalensis* 2 and 19 cm. Another table gives the average depth at which these species were found over a period of one year; in the same order as above these were respectively 11 cm., 38.2 cm., 45.8 cm., 34.5 cm. and 7 cm.; *L. natalensis* and *B. pfeifferi* were never found deeper than 1 m. and of the remaining only a small proportion were found deeper than this, thus the maximum depth of collection was 2.70 m. for *B. coulboisi*, 5 m. for *B. alberti* and *G. natalensis* and 7 m. for *Melanoides* sp. An experiment demonstrated that *Biomphalaria* can survive and lay eggs at a depth of 15 m. for at least 31 days.

W. M. Fitzsimmons

1861—KASSAI, T., 1957. "Vizsgálatok a juhok gócos tüdőférgességéről. III. A juh-protostrongylidák köztigazdái hazánkban." *Magyar Állatorvosok Lapja*, 12 (6), 169–172. [English & Russian summaries p. 172.]

The obligate intermediate hosts of *Cystocaulus ocreatus*, *Protostrongylus rufescens* and *Muellerius capillaris* are several snail species occurring on sheep pastures in Hungary. *Abida frumentum*, preferring moist and shaded habitats in the lower levels of the sward in which the first-stage larvae of the parasites accumulate, is more important in spreading infection than *Helicella obvia* and especially the larger species (*Zebrina detrita*, *Theba carthusiana*, *Cepaea vindobonensis*, *Helix pomatia*) which occur in sunnier habitats.

I. Szladits

1862—MICHELSON, E. H., 1961. [Department of Tropical Public Health, Harvard School of Public Health, Boston, Massachusetts, U.S.A.] "The effects of temperature on growth and reproduction of *Australorbis glabratus* in the laboratory." *American Journal of Hygiene*, 73 (1), 66–74.

Michelson has observed the effects on growth and reproduction of exposure of populations of *Australorbis glabratus* to hypothermal and hyperthermal conditions. Growth was most rapid at 30°C. (as measured by increase in shell diameter), but at this temperature reproduction was inhibited. Sexually mature snails at 30°C. showed a decline in fecundity; sexually immature snails at 30°C. often showed thermal castration of the females, manifest as pathological changes in the reproductive tissues. At 15°C. and 20°C. both growth and reproduction were inhibited; there were no pathological changes associated with this hypothermia, both growth and reproduction proceeding on transfer of the snails to higher temperatures.

J. W. Smith

1863—OKAMOTO, K., 1960. [Department of Medical Zoology, Showa Medical School, Tokyo, Japan.] [Seasonal occurrence of *Oncomelania nosophora* on Kofu District.] *Japanese Journal of Parasitology*, 9 (6), 701–705. [In Japanese: English summary p. 705.]

From October 1958 to September 1959 the monthly changes in the distribution of shell length and the seasonal occurrence of *Oncomelania nosophora* were observed in two different habitats, one being rice paddies and the other irrigation ditches, in Kofu District, Yamanashi Prefecture. The number of newly hatched snails found in the irrigation ditches was higher than in rice paddies. It was conceivable that young snails appearing in the autumn were unable to develop into adults before the winter. Snails over 2 mm. in shell length could survive the winter. Most adult snails remained alive along the slope of a dyke with a southern aspect with the soil temperature about 15°C. at 10.10 a.m. and 10°C. at sunset.

Y. Yamao

1864—PAN, C. T., 1958. [Department of Tropical Public Health, Harvard School of Public Health, Boston, Massachusetts, U.S.A.] "The general histology and topographic microanatomy of *Australorbis glabratus*." *Bulletin of the Museum of Comparative Zoology at Harvard College*, 119 (3), 237–299.

1865—ROTH, A. A. & WAGNER, E. D., 1960. [Department of Biology, Emanuel Missionary College, Berrien Springs, Michigan, U.S.A.] "The development of sexual maturity in *Oncomelania nosophora* (Robson) snail vector of oriental schistosomiasis." *Transactions of the American Microscopical Society*, 79 (4), 429–438.

1866—TANAKA, M., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on *Trichobilharzia physellae* in Oki Islands. 2. Four kinds of schistosome cercariae parasitic in *Lymnaea japonica* in Oki Islands.] **Japanese Journal of Parasitology**, 9 (5), 604–609. [In Japanese: English summary p. 609.]

Of 55,620 *Lymnaea japonica* in Oki Islands, 132 were found infected with schistosome cercariae resembling *Cercaria ocellata*. These cercariae were divided into four groups on morphological characteristics and were temporarily named Cercaria A, B, C and D. Cercaria A was identified with *C. physellae*. Cercaria A, B and C were experimentally proved to cause rice-field dermatitis in this area. Y. Yamao

1867—WRIGHT, C. A., 1960. [Department of Zoology, British Museum (Natural History), London, S.W.7.] "The crowding phenomenon in laboratory colonies of freshwater snails." **Annals of Tropical Medicine and Parasitology**, 54 (2), 224–232.

Wright describes a series of experiments designed to investigate the causes of dwarfing and loss of fecundity in snails raised in the laboratory under crowded conditions. The results of these experiments indicate that the effects are probably brought about by an accumulation of excretory products in the water. C. A. Wright

1868—ZDUN, V. I., 1958. [Nauchno-issledovatel'skiy institut zemledeliya i zhivotnovodstva zapadnykh rayonov Ukrainskoi, SSR, U.S.S.R.] [*Paramphistomum cervi* and other digenean infections in Planorbidae in water reservoirs in the Ukraine.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatel'stvo Akademii Nauk SSSR, pp. 135–138. [In Russian.]

Paramphistomum cervi cercariae were found in *Planorbis planorbis*, *P. carinatus*, *Anisus spirorbis* and *Gyraulus albus*. Other cercariae present in *P. planorbis* were: *Cercaria diplocotylea*, nine kinds of xiphidiocercariae, three of furcocercariae, three of echinocercariae, two of cysticercariae and three of cercariae. *Segmentina nitida* was free from trematode infection. *Fasciola hepatica* larvae were found in *Galba truncatula*. *Parafasciolopsis fasciolaemorphia* cercariae only occurred in *Coretus corneus*. N. Jones

Control

1869—BLANC, M., 1958. "Lutte contre l'onchocercose et protection piscicole en A.O.F." **Terre et la Vie**. Paris, 105 (2), 112–127.

After reviewing the results of an attempt to control simuliids in Mayo-Kebbi [for abstract see Helm. Abs., 24, No. 207m], Blanc summarizes the results of work, carried out in this respect in the Upper Volta regions [for abstracts see Helm. Abs., 25, Nos. 195a & 255a and 27, No. 97e]. N. Jones

1870—BURNETT, G. F., 1960. [Filariasis Research Unit, Fiji.] "Filariasis research in Fiji, 1957–1959. Part III. Experiments in control of adult mosquitoes." **Journal of Tropical Medicine and Hygiene**, 63 (9), 208–215.

The village of Mau in Fiji was sprayed with dieldrin at the respective doses of 25 mg., 132 mg. and 52 mg. of deposit per sq. ft. Although the spraying reduced daylight catches of *Aedes fijiensis* (for a few weeks) and *Culex fatigans*, it had little effect on *C. annulirostris*. The insecticidal action weakened with time and was more persistent in a wooden house with iron roof and a floor than in the Fijian type of house (bure). The sprayings also reduced the expectation of life of *A. fijiensis* although the local population was not reduced. In another village, where *C. fatigans* prevailed, 40 mg. of dieldrin deposit per sq. ft. reduced the number of mosquitoes resting in the houses. However, all effect was lost after seven months and breeding of mosquitoes was not prevented. N. Jones

1871—MENON, M. A. U. & PILLAI, V. M., 1958. [Central Malaria Laboratory, Trivandrum, India.] "Engineered mosquito breeding in Trivandrum City." **Bulletin of the National Society of India for Malaria and Other Mosquito-Borne Diseases**, 6 (3), 91–98.

- 1872—NAIR, C. P. & RAY, A. P., 1959. [Malaria Institute of India, Delhi, India.] “‘Simazin’ as a weed killer against *Pistia stratiotes*.” **Bulletin of the National Society of India for Malaria and other Mosquito-Borne Diseases**, 7 (2), 65–66.

The larvae and pupae of *Mansonioides annulifera*, a vector of *Wuchereria malayi*, attach themselves to the free-floating rootlets of the aquatic weed, *Pistia stratiotes*; adult mosquitoes lay eggs on the under-surface of the leaves of this plant. Simazin, a weed-killer applied at the rate of 10 kg. to 15 kg. per hectare, is effective in controlling the weed. No lethal effects were observed against fishes, frogs or aquatic insects.

J. W. Smith

Miscellaneous

- 1873—GOLIKOVA, M. N., 1960. [An ecological and parasitological study of the biocoenosis of some lakes in the Kaliningrad region. IV. The trematode fauna of invertebrates.] **Vestnik Leningradskogo Universiteta. Seriya Biologii**, 15 (21), 80–94. [In Russian: English summary p. 93.]

Golikova has studied the trematode fauna from 4,781 invertebrates (17 species of molluscs, one of crustaceans, three of leeches and 22 of insects) from two lakes on a poultry farm in the Kaliningrad region. She found 39 species of larval and one adult trematode and gives tables listing (i) hosts with rates of infection and (ii) trematodes with details of hosts of the cercarial and metacercarial stages and their infection rates, and the final hosts. Species for which the life-histories are not known are briefly discussed and short descriptions are given of unidentified *Tetracotyle* sp. from *Erpobdella octoculata* and *Metacercaria* sp. from *Asellus aquaticus* and dragon-flies. The following new host records are made: *Valvata piscinalis* for *Asymphylodora tincae* cercaria and *Cercaria cordiformis*; *Coretus corneus* for *Cotylurus* sp. (*Cercaria helvetica* XXXIV Dubois); *Lymnaea stagnalis* for *Cercaria* I Petersen (this species is reported for the first time from Russia); *Radix ovata* for *C. micromorpha*; *R. auricularia* for *Xiphidiocercaria* VI Ginetsinskaya, 1959; and *R. auricularia* and *Galba palustris* for *Xiphidiocercaria* I Ginetsinskaya, 1959.

G. I. Pozniak

GENERAL HELMINTHOLOGY

Technique

- 1874—ANDRONIKASHVILI, R. V., 1960. [The examination of carcasses infected with cysticerciasis.] **Veterinariya**, 37 (9), 80–81. [In Russian.]

- 1875—CAMPBELL, W. C. & RICHARDSON, T., 1960. [Merck Institute for Therapeutic Research, Rahway, New Jersey, U.S.A.] “Stimulation of cysticercus evagination by means of surfactants.” **Journal of Parasitology**, 46 (4), 490.

Campbell & Richardson report stimulating the evagination of undetermined species of cysticerci by means of immersion in solutions of various household detergents. Solutions prepared from a bar of household soap also proved effective but to a lesser degree. It is not known whether this means of inducing evagination affects the viability of isolated larvae. I. L. Owen

- 1876—CARNERI, I. DE, 1958. [Istituto d'Igiene e Microbiologia dell'Università di Pavia Istituto Carlo Erba per Ricerche Terapeutiche—Laboratorio di Microbiologia, Milano, Lombardy, Italy.] “Osservazioni sugli indici dell'azione chemioterapica di sostanze attive su *Schistosoma mansoni* nel topo.” **Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia**, 39 (6), 400–424. [English, French & German summaries pp. 416–419.]

From experiments on white mice injected intraperitoneally with 70 cercariae of a Liberian strain of *Schistosoma mansoni* from *Australorbis glabratus* it is concluded that the most sensitive indication of schistosomicidal activity of a drug is the definite or temporary interruption of elimination of live eggs in the faeces. When no disturbance in their elimination occurs in a group of four or more infected mice after treatment the chemical under test can be considered inactive. If there is interruption, confirmatory evidence should be sought by post-mortem examination and the number of live and paired worms compared with the total number recovered, the percentage of worms present in the mesenteric veins and the number of those mice partially and those completely cured.

R. T. Leiper

1877—CASTRO BARBOSA, N. DE, 1957. "Pesquisa de parasitos nas fezes." *Revista Brasileira de Medicina*, 14 (4), 239-240. [English summary p. 240.]

1878—CHERNIN, E., 1959. [Department of Tropical Public Health, Harvard School of Public Health, Boston, Massachusetts, U.S.A.] "Cultivation of the snail, *Australorbis glabratus*, under axenic conditions." *Annals of the New York Academy of Sciences*, 77 (2), 237-245.

Chernin describes a method of obtaining bacteriologically sterile *Australorbis glabratus* in tubes containing penicillin and streptomycin in a suitable salt solution essentially the same as that described by him in an earlier paper [for abstract see Helm. Abs., 26, No. 60g]. Subsequent feeding of such snails is best carried out in the absence of antibiotics. A mixture of autoclaved brewer's yeast and formalin-killed *Escherichia coli* forms a suitable diet; growth of the snails does not take place in the absence of either component or if the *E. coli* is killed by autoclaving instead of by formalin. Of 137 snails fed in the presence of streptomycin only about 14% grew, while 80% grew in the absence of streptomycin. Streptomycin also inhibits the hatching of eggs; this effect may be prevented by the addition of certain cations, notably those of calcium.

J. W. Smith

1879—CLAUGHER, D., 1960. [Department of Zoology, British Museum (Natural History), London, England.] "The transport and laboratory culture of snail intermediate hosts of *Schistosoma haematobium*." *Annals of Tropical Medicine and Parasitology*, 54 (3), 333-337.

Claugher describes methods for packing bulinid snails for transport by post and their subsequent maintenance in the laboratory. He emphasizes the importance of not making the packing material too wet and of packing the snails sufficiently firmly so that they are not damaged by being knocked around in the post. He describes the laboratory conditions under which these snails have been successfully maintained for over five years and lists some of the common pests which appear in the aquaria and methods for dealing with them.

C. A. Wright

1880—DEWHIRST, L. W. & HANSEN, M. F., 1961. [Department of Zoology, Kansas State University, Manhattan, Kansas, U.S.A.] "Methods to differentiate and estimate worm burdens in cattle." *Veterinary Medicine*, 56 (2), 84-89.

In this paper, designed to assist practitioners in the estimation of worm burdens in cattle, the morphological features of eggs of helminths likely to be encountered in cattle are discussed and illustrated by photomicrographs. A method of species identification of infective nematode larvae based on measurement of total length (anterior end to tip of sheath), length of tail sheath (anus to tip of sheath) and the extension of the sheath beyond the tail of the larva and the use of a nomogram (illustrated) is given. Egg counting and total worm count estimations in cattle are described. Egg-worm ratios are not the same for all genera of nematodes in cattle; they are also influenced by the age of the host and its diet.

W. M. Fitzsimmons

1881—DROPKIN, V. H. & SMITH, Jr., W. L., 1960. "Recovery of nematodes from infected roots by enzyme preparations." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] *Phytopathology*, 50 (9), 634.

1882—ELLENBY, C. & GILBERT, A. B., 1960. [Department of Zoology, King's College, University of Durham, Newcastle-upon-Tyne, England.] "A convenient modification of the dilution hatching trial for the potato-root eelworm, *Heterodera rostochiensis* Wollenweber." *Journal of Helminthology*, 34 (1/2), 99-102.

Ellenby & Gilbert have modified the procedure for hatching tests devised by Fenwick [for abstract see Helm. Abs., 21, No. 331b] by reducing the number of cysts in each batch from 100 to 10. Log total hatch is used instead of the total hatch itself and the mean for each dilution is determined from these log values. The log of the mean is then plotted against log dilution to restore linearity. The use of commercially available plastic utensils is recommended for hatching tests.

A. M. Shepherd

- 1883—GARABEDIAN, G. A., MALAKIAN, A. H. & MATOSSIAN, R. M., 1960. [Department of Bacteriology and Virology, American University of Beirut, Beirut, Lebanon.] "A simple haemagglutination drop test for human hydatidosis." *Annals of Tropical Medicine and Parasitology*, **54** (2), 233–235.

Garabedian *et al.* describe a method of detecting cases of hydatid suitable for examining large populations in field surveys. One drop of serum, which is obtained from a few drops of the patient's blood, is mixed with four drops of physiological saline (dilution 1:5). One drop of this mixture is placed in a small convex bottom tube with two drops of physiological saline and three drops of 0.5% sensitized erythrocytes. This is shaken and left at room temperature for 90 minutes. A positive reaction is indicated when the erythrocytes settle in an irregular manner or form a rough layer of cells at the bottom of the tube. G. A. Webster

- 1884—KOMIYA, Y., KOBAYASHI, A., SUGIYAMA, T. & KUTSUMI, H., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [Comparative studies on the techniques for stool examination for hookworm ova during the cold climate, particularly on the recovery rate of hookworm ova with brine flotation technique and on culturing one with filter paper.] *Japanese Journal of Parasitology*, **9** (5), 480–485. [In Japanese: English summary p. 485.]

The positive rate for hookworm ova in human faeces was much lower with the culturing technique (25.7%) than with the flotation technique (64.8%). This is attributed to the winter temperature which was too low for the eggs to hatch. The flotation technique is therefore recommended during the winter. Y. Yamao

- 1885—LONDERO, A. T. & MORAES, L. L. DE, 1958. [Faculdade de Farmácia de Santa Maria, Universidade do Rio G. do Sul, Brazil.] "Usos da solução 'M.I.F.' de Saperó e col. em parasitologia e higiene." *Hospital. Rio de Janeiro*, **54** (1), 107–110. [English summary p. 110.]

- 1886—LYON, H. H. & MAI, W. F., 1960. "A technique for making high-resolution continuous-tone photographs of nematodes." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] *Phytopathology*, **50** (9), 644.

- 1887—MADAMBA, C. P., 1960. "A practical method of collecting soil nematodes for population surveys." *Philippine Agriculturist*, **44** (2/3), 146–148.

Madamba describes and figures a method of extracting active soil nematodes by a modified Baermann funnel technique following sieving. [No data are given to support his claims as to the efficacy of the method.] R. D. Winslow

- 1888—MATOV, K. P., 1960. [The advisability of examining the oesophagus for trichinellosis instead of the diaphragm pillars in pig carcasses.] *Veterinariya*, **37** (9), 77–79. [In Russian.]

In reviewing trichinoscopy of pork, Matov mentions the findings of Kosminkov [for abstract see *Helm. Abs.*, **29**, No. 609], and those of Dyakonov (1939) and concludes that examination of a standard number of sections of the oesophagus or pharyngeal muscles instead of the pillars of the diaphragm could lead to the oversight of positive cases. This would be of consequence in epidemiological work. He also states that using very low experimental infections with *Trichinella* in animals, including pigs, he never observed cases where trichinae could only be found in the pillars of the diaphragm and not in the skeletal musculature. N. Jones

- 1889—MORIARTY, F., 1960. "Laboratory errors associated with the estimation of the population density of *Heterodera* species in soil." *Annals of Applied Biology*, **48** (4), 665–680.

Apart from the residual variation there were two other important sources of variation when sampling soil for eggs of *Heterodera* spp. There was a large variation between sub-samples caused by differences in the numbers of cysts and in the numbers of eggs per cyst. There was also a difference between observers counting the same eggs of up to 20%. Moriarty concludes that where a comparative measure of density is sufficient, this bias is probably unimportant, and to increase accuracy of estimates of eelworm density, most laboratory work should be devoted to the separation of cysts from the soil sample. H. R. Wallace

- 1890—PORTALIMOV, G. T., 1960. [Improved trichinoscopy of pork.] *Veterinariya*, **37** (9), 79–80. [In Russian.]

- 1891—STALLYBRASS, F. C., 1959. [Central Laboratories, Portsmouth, England.] "A concentration method for the rapid demonstration of microfilariae in peripheral blood." [Correspondence.] *Lancet*, Year 1959, 2 (7099), 415.

5 ml. of venous blood was placed in a bijou bottle with sequestrene or Heller & Paul's mixture and allowed to sediment. The plasma was removed to a round bottomed 8 mm. bore centrifuge tube and spun at 3,000 r.p.m. for five minutes in an angle centrifuge. Using a Pasteur pipette, the sediment, containing leucocytes, platelets, a few red cells and the microfilariae, was transferred from the tube to a slide and a thick smear was prepared. This was air dried and stained by Leishman's method for thin blood films. After drying and mounting in oil for examination under low magnification, this type of smear revealed many more microfilariae of *Loa loa* than did thick smears of the red cell sediment or whole blood. J. E. D. Keeling

- 1892—TAYLOR, A. E. R., 1960. [National Institute for Medical Research, The Ridgeway, Mill Hill, London.] "Maintenance of filarial worms *in vitro*." *Experimental Parasitology*. New York, 9 (2), 113–120.

Taylor gives a very detailed account of the media and methods used in her experiments on the *in vitro* culture of adult and larval filarial nematodes. She includes an account of attempts to culture filarial larvae from their arthropod hosts. The culture of adult filariae was more successful than that of microfilariae or their mosquito stages. The earlier stages from the mosquito were the most difficult to cultivate. The greatest success was achieved with *Litomosoides carinii* adults which survived *in vitro* up to 23 days, the females produced microfilariae for 18 days, this being approximately normal behaviour; fresh rat serum was used in this medium. Adult *Dirofilaria immitis* survived seven days *in vitro*; microfilariae were produced in the first two days only. *Microfilaria immitis*, *Mf. loa* and *Mf. bancrofti* survived for 10 to 14 days in culture media; in the case of *Mf. loa* the G cells one and two divided. Infective larvae of *D. immitis* removed from *Aedes aegypti* were maintained for nine days *in vitro*; they moulted but did not increase in size. W. M. Fitzsimmons

Geographical Distribution

- 1893—ALLGÉN, C. A., 1958. "Vergleich zwischen den marinen Nematoden Norwegens und denen der subtropischen (—und temperierten) Faunengebiete in der südlichen Hemisphäre." *Kongelige Norske Videnskabers Selskabs Forhandling*, Year 1957, 30, 93–98.

Allgén tabulates published numerical data on the marine nematode fauna of South Africa, Australia, New Zealand and South America. From each publication cited, the number of species the region concerned has in common with Norway is given and also expressed as a percentage of the total recorded marine nematode fauna of the region and of Norway. Few of the species involved are named. R. D. Winslow

- 1894—ANDERSON, J. L., 1960. [Department of Agriculture, Stock & Fisheries, Port Moresby, New Guinea.] "Animal health picture of the Territory of Papua and New Guinea." *Papua and New Guinea Agricultural Journal*, 13 (2), 52–58.

In a paper dealing with the general disease position of livestock in Papua and New Guinea, Anderson writes that *Stephanurus dentatus* is wide-spread and causes some deaths and that parasites of pigs and poultry are particularly in need of control. A list of helminths recorded from cattle, horses, pigs, sheep, goats, poultry, dogs and cats is appended. W. M. Fitzsimmons

- 1895—ANTHONY, D. J., 1960. "Trichinosis and British pigs." *Veterinary Record*, 72 (40), 829.

Anthony, writing on *Trichinella spiralis* in Britain, states that "the parasite seems to be absent from pigs bred in this country. The last series of human infection with *Trichinella* took place in the Wolverhampton district during the Second World War, but was not traced to pigs bred in Britain". In view of the fact that a Continental breed of pig has been introduced since then a special examination for *T. spiralis* of 10,000 pigs mainly from British centres was carried out with negative findings; "this seems to indicate that there is some truth in the contention that trichinosis is not found in British pigs". The author concludes with the caution that

inspection for *Trichinella* should nevertheless be carried out in every slaughterhouse "although facilities for the 10 per cent. inspection carried out in some Continental slaughterhouses are not provided by our Local Authorities, there is no reason why a veterinary meat inspector should not undertake some daily inspections for *Trichinella* himself. A negative result is often more valuable than a positive one."

W. M. Fitzsimmons

1896—CHUANG, C. H., HSIEH, H. C. & WU, Y. T., 1957. [Taiwan Provincial Malaria Research Institute, Taiwan, China.] "A new endemic area of *Wuchereria bancrofti* infection in Taiwan." *Journal of the Formosan Medical Association*, **56** (5), 171–175. [Chinese summary p. 175.] Chuang *et al.* examined night blood smears from 1,104 inhabitants of a village in south-west Formosa. Of these, 53 were positive for the microfilariae of *Wuchereria bancrofti*, giving a gross infection rate of 4.8%. Although the degree of filarial infection in Formosa may be light at present, the authors suggest that the problem of filariasis should be attacked before it becomes a greater menace.

J. W. Smith

1897—MAI, W. F., CRITTENDEN, H. W. & JENKINS, W. R., 1960. [Dept. of Plant Pathology, Cornell University, Ithaca, N.Y., U.S.A.] "Distribution of stylet-bearing nematodes in the north-eastern United States." *Bulletin. New Jersey Agricultural Experiment Station*, No. 795, 62 pp.

Data from 8,800 soil and root samples in the north-eastern U.S.A. are tabulated in three ways: geographical distribution of the various genera and species of stylet nematodes, and plant-nematode associations listed under plants and under nematodes. *Aphelenchoides*, *Aphelenchus*, *Tylenchus*, *Pratylenchus*, *Hoplolaimus*, *Meloidogyne*, *Paratylenchus*, *Tylenchorhynchus*, *Xiphinema*, *Ditylenchus*, *Helicotylenchus*, *Hemicylophora*, *Psilenchus* and *Trichodorus* were the most commonly encountered genera, the first four listed being found associated with more than 100 plant species, with *Pratylenchus* and the next five genera containing the most frequently identified species. *Meloidogyne hapla* was by far the commonest root-knot species found out-of-doors in the region, *M. arenaria arenaria*, *M. incognita* var. *incognita*, *M. incognita* var. *acrita* and *M. javanica* being confined to the southern half of the region. *Heterodera rostochiensis* was found only on potatoes in New York, *H. tabacum* only on tobacco in Connecticut, with *H. cacti*, *H. schachtii*, *H. trifolii* and *H. weissi* more widely distributed. *Meloidodera* was found only in New Jersey and Maryland, *Anguina tritici* only on wheat in Maryland and *Belonolaimus*, *Dolichodorus* and *Radopholus gracilis* only in New Jersey.

R. D. Winslow

1898—TAYLOR, E. L., 1960. [Central Veterinary Laboratory, Ministry of Agriculture, Fisheries & Food, New Haw, Weybridge, Surrey, England.] "*Trichinella* in the British Isles." [Correspondence.] *Veterinary Record*, **72** (42), 885.

Taylor, commenting on the note on trichinosis and British pigs by Anthony [see abstract No. 1895 above] warns against complacency at the negative findings in pigs and points out that since the Wolverhampton outbreak of human trichinosis, quoted by Anthony as being the last one in Britain, there have been nine, two in Wales, five in England, one in Northern Ireland and one in Eire. The parasite has a wide-spread occurrence in rats in these islands with a high incidence in some areas, thus 25% in south-east London, 9% in Penrith and two of 13 rats examined in Wolverhampton. *Trichinella* has recently been reported from a fox in Truro and some hundreds of diaphragms recently examined have revealed a human incidence of over 10%. Taylor makes the point that the negative result of an examination of pigs' carcasses is of very little significance compared with the positive evidence provided by the occurrence of an outbreak both for the presence of the parasite and its ability to get through from rats to man.

W. M. Fitzsimmons

***1899**—UNAT, E. K., 1958. "Türkiye'de insanlarda helmint infeksiyonlarının bugünkü durumu." [Present state of helminth infections in Turkey.] *Türk Tıp Cemiyeti Mecmuası*, **24** (4), 236–248.

Cytology and Genetics

- 1900—BURCH, J. B., 1960. [Mollusc Division, Museum of Zoology, University of Michigan, U.S.A.] "Chromosome numbers of schistosome vector snails." *Zeitschrift für Tropenmedizin und Parasitologie*, **11** (4), 449–452. [German summary p. 451.]

The haploid chromosome number of *Planorbina* (= *Australorbis*) *glabratus* and *P.* (= *Biomphalaria*) *sudanica* is 18. The haploid number of *Bulinus truncatus* and *B.* (*Physopsis*) *ugandae* is 36. Burch presents evidence suggesting that the two species of *Bulinus* are tetraploids. Polyploidy appears to be more common in fresh-water pulmonate snails than previously thought. The "strain" differences of certain species of *Bulinus* in their ability to be infected with *Schistosoma haematobium* may be correlated with the degree of polyploidy of the snail population. Photomicrographs and camera lucida drawings show various phases of meiotic chromosomes.

J. W. Smith

- 1901—CHENG, T. C. & PROVENZA, D. V., 1960. [Department of Biology, Lafayette College, Easton, Pennsylvania, U.S.A.] "Studies on cellular elements of the mesenchyme and of tissues of *Haematoloechus confusus* Ingles, 1932 (Trematoda)." *Transactions of the American Microscopical Society*, **79** (2), 170–179.

Cheng & Provenza describe and figure three distinct cell types in the mesenchyme of adult *Haematoloechus confusus*, which they designate as beta, alpha and haemocytes. Beta and alpha cells are conceived to be undifferentiated mesenchymal cells which differentiate further and form other tissues and structures such as the cuticle and ducts of the secretory glands. Two distinct cell types were identified in the epithelial lining of the intestinal caeca, the larger of the two believed to be secretory.

E. I. Sillman

- 1902—GOPLIN, B. P. & STANFORD, E. H., 1960. "Autotetraploidy and linkage in alfalfa—a study of resistance to two species of root-knot nematodes." *Agronomy Journal*, **52** (6), 337–343.

Goplin & Stanford review the literature on the genetics of resistance to nematodes and describe their own experiments and conclusions on resistance in lucerne to *Meloidogyne hapla* and *M. javanica*. The only varieties which were found to contain resistant individuals were Vernal and Hilmar. Resistance to the two species of nematode in a clone selected from Vernal was controlled by single dominant tetrasomic genes for each species. The genes governing resistance to the two species are different but closely linked. One other Vernal selection showed resistance to both species and a third Vernal selection and one from Hilmar showed resistance to *M. hapla* only. The genetic data for these clones was less conclusive but inheritance appeared to be relatively simple.

A. M. Shepherd

- 1903—GOVAERT, J., 1957. [Université de Gand, Laboratoire d'Anatomie humaine et d'Anatomie comparée, Ghent, Belgium.] "Etude quantitative de la teneur en acide désoxyribonucléique des noyaux des cellules somatiques et germinatives chez *Fasciola hepatica*." *Archives de Biologie*, **68** (2), 165–200.

Govaert studied the DNA content of the germinal and somatic cells of *Fasciola hepatica* by histophotometry after Feulgen staining. The DNA content of the young primary spermatocytes undergoes considerable augmentation to more than double the diploid quantity. Further development is accompanied by progressive loss, the spermatid containing only the haploid quantity and this remains unchanged in the mature spermatozoid and young male pronucleus. Measurements of DNA content during oogenesis were technically difficult but the young primary oocyte contained more than the 4n value of DNA. The quantities of DNA in the germinative vesicles was of the same order as in the young oocyte nuclei. The first polar body appears to have a diploid DNA content and the second polar body and female pronucleus haploid values. Simultaneous synthesis of DNA occurs in the two pronuclei bringing them from haploid to diploid quantities of DNA and the amount of DNA necessary for the nuclei of the first two blastomeres is prepared. The nuclei of the somatic tissues (gut epithelium and connective tissue) possess the diploid quantity of DNA. In the vitelline cells the quantities of DNA vary distinctly with the metabolic activity of the cells. When metabolism is fairly low the cells fall into two clearly defined groups—one with tetraploid quantities of DNA and the other with octoploid. When metabolic activity is high the nuclei contain extremely variable amounts of DNA.

S. Willmott

1904—SERRA, J. A. & PICCIOCHI, P. G. C., 1960. [Institute of Zoology and Anthropology, Faculty of Science, University of Lisbon, Lisbon, Portugal.] "Demonstration of canonic gonial mitosis and meiosis in *Parascaris equorum*." **Science, Lancaster, Pa**, **132** (3437), 1400–1401.

Serra & Picciochi have demonstrated, by observations on living *Parascaris equorum* and material fixed in AFA fixative (2 volumes 96% alcohol, 1 volume 40% formalin, 0.1 volume glacial acetic acid) using a special technique which is described, that separate chromosomes appear in meiotic prophase; there is no fusion into a chromatin mass as described by other workers, this effect being merely an artefact caused by fixation in conventional ways. No club-shaped chromosome ends appear during mitosis.
S. Willmott

1905—TOKIN, I. B., 1959. [Institut morfologii zhivotnikh im. A. N. Severtsova, Akademiya nauk SSSR, U.S.S.R.] [Ultrastructure of the ciliated border of the intestinal epithelium of *Parascaris equorum*.] **Dokladi Akademii Nauk SSSR**, **125** (4), 902–904. [In Russian.]

A study by electron microscopy of the intestinal epithelium of *Parascaris equorum* showed that the ciliated border is composed of numerous compactly set rod-shaped projections of the cell membrane; these projections have a double membrane around the lumen. There is also a further membrane (~ 217 Å thick) common to the whole ciliated border. No basal structures were seen in the epithelial cells, this function being apparently performed by the well developed individual membranes of the projections and the common membrane of the border. The paper is illustrated by photomicrographs and a diagram.
G. I. Pozniak

1906—TOKIN, I. B., 1959. [Institut morfologii zhivotnikh im. A. N. Severtsova, Akademiya nauk SSSR, U.S.S.R.] [The structure of the nucleus and Golgi apparatus in the cells of the intestinal epithelium of *Parascaris equorum*.] **Dokladi Akademii Nauk SSSR**, **125** (5), 1126–1129. [In Russian.]

Tokin describes and illustrates by drawings and photomicrographs the structure of the intestinal wall of *Parascaris equorum* and of the Golgi apparatus (which had hitherto not been observed in the intestinal cells of ascaris). Electron microscopy showed that (i) the nuclear membrane is rich in pores (which pass through both membrane layers); conglomerations of osmiophilic granulation, similar in granule size to the macromolecules of RNA, are present in the nucleus and numerous such granules also on the nuclear membrane; (ii) the cytoplasm of the basal section of the intestinal cells contains besides the nucleus dictyosomes and ergastoplastic sacs, also two types of previously undescribed structures with properties which bring them near to the Golgi apparatus, ergastoplast and mitochondria; (iii) the dictyosomes of the Golgi apparatus are small (310μ to 720μ) and are composed of six to eight parallel canaliculi with typical terminal vesicle-like distensions; the ergastoplastic apparatus is represented chiefly by sac-like structures, 1μ in length.
G. I. Pozniak

Morphology, Anatomy and Histology

1907—ASTAFEV, B. A., 1960. [Differential diagnosis of clonorchiasis, metagonimiasis and opisthorchiasis by the morphology of the eggs.] **Meditinskaya Parasitologiya i Parazitarnie Bolezni, Moscow**, **29** (5), 607–609. [In Russian: English summary p. 609.]

Astafev gives and illustrates by five photomicrographs the diagnostic features of the eggs of *Metagonimus yokogawai*, *Clonorchis sinensis* and *Opisthorchis felineus* which can be used in faecal examinations.
N. Jones

1908—BALOZET, L. & SICART, M., 1960. [Institut Pasteur d'Algérie et Laboratoire de Parasitologie de la Faculté mixte de Médecine et de Pharmacie de Toulouse, Haute-Garonne, France.] "Un hémiuride parasite de l'anguille." **Archives de l'Institut Pasteur d'Algérie**, **38** (1), 44–49.

Hemiurus communis is redescribed from the stomach of *Anguilla anguilla* in southern France. The eels were caught in fresh water at a time near to their return migration. It is suggested that infection with metacercariae probably takes place in the sea and that these trematodes survive several years in the eels.
W. M. Fitzsimmons

1909—BECKETT, E. & BOOTHROYD, B., 1961. [Department of Histology, University of Liverpool, Liverpool, U.K.] "Electron microscope studies on the morphology of *Trichinella spiralis*." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 55 (1), 5-6.

1910—CARDELL, Jr., R. R. & PHILPOTT, D. E., 1960. [Department of Physics, Edsel B. Ford Institute for Medical Research, Detroit, Michigan, U.S.A.] "The ultrastructure of the tail of the cercaria of *Himasthla quissetensis* (Miller and Northup, 1926)." **Transactions of the American Microscopical Society**, 79 (4), 442-450.

When the tail of the free-swimming cercariae of *Himasthla quissetensis*, was sectioned with an ultra-microtome and studied with an electron microscope, a layer of smooth muscle with perpendicular fibres was seen laying internal to the cuticle. Beneath this there is a layer of striated muscle with spirally arranged fibres containing many mitochondria in their sarco-plasm. Massed inside the striated muscle fibres there is a core of parenchyma cells. The function of the mitochondria may be to provide an abundant supply of adenosine triphosphate for the contraction of the smooth muscle layer.

R. T. Leiper

*1911—CHYLA, M., 1957. "K diferenciálnej diagnostike vajíčok *Fasciola hepatica* a *Paramphistomum cervi*." [Differentiation of eggs of *Fasciola hepatica* and *Paramphistomum cervi*.] **Veterinárstvi. Brno**, 7 (12), 361-363.

1912—DOLLFUS, R. P., 1960. "Recherches sur le développement et l'identification de *Plagiorchis* (*Multiglandularis*) *cirratus* (Rudolphi 1802). II. Description et identification." **Annales de Parasitologie Humaine et Comparée**, 35 (3), 282-291.

Dollfus figures and describes *Plagiorchis cirratus* from specimens reared in white mice. He discusses the difficulties of identification of species in the genus *Plagiorchis* due to considerable individual variation, and reviews the various attempts to organize subgeneric groups of species within the genus and to define the limits of the genus. He indicates that the definitive host of *P. cirratus* at Richelieu is not yet known, but may ultimately prove to be one or more of the species of migratory birds pausing temporarily at that Station.

E. I. Sillman

1913—FRASER, P. G., 1960. [Department of Zoology, University of Bristol, Bristol, England.] "The form of the larval hooks as a means of separating species of *Diphyllbothrium*." **Journal of Helminthology**, 34 (1/2), 73-80.

Differences in the form of the hooks in the coracidium and proceroid stages of four species of *Diphyllbothrium* are described. The characters examined were the blade, including the shape of the tip, the guard, the length of the handle and the size of the hooks. Fraser states that the hooks of members of the genus *Diphyllbothrium* differ from those of *Ligula* and *Schistocephalus* and that a different type of hook is associated with each of the four species, *D. medium*, *D. ditremum*, *D. dendriticum* and *D. latum*.

H. H. Williams

1914—FREITAS, J. F. TEIXEIRA DE, MACHADO DE MENDONÇA, J. & GUIMARÃES, J. P., 1959. "Sobre algumas espécies do gênero *Capillaria* Zeder, 1800 parasitas de aves (Nematoda, Trichuroidea)." **Memorias do Instituto Oswaldo Cruz**, 57 (1), 17-31.

Five species of *Capillaria* are redescribed. These are: *C. collaris* which is recorded from a new host, *Odontophorus capueira capueira*, in Brazil; *C. perforans*; *C. phasianina*, from *Phasianus colchicus torquatus*, which is recorded from Brazil as a new record; *C. venusta*; *C. plagiatica*. The histopathology of *C. venusta* infections in *Pteroglossus aracari wiedii* and *Ramphastos vitellinus ariel* is described. The value of the ratio of the length of the oesophageal portion of the body to the length of the rest of the body is discussed.

W. G. Inglis

1915—GERSCH, M. & SCHEFFEL, H., 1958. [Zoologisches Institut Friedrich-Schiller-Universität, Jena, East Germany.] "Sekretorisch tätige Zellen in Nervensystem von *Ascaris*." **Naturwissenschaften. Berlin**, 45 (14), 345-346.

Using the Gomori technique and paraldehyde-fuchsin staining, a pair of bipolar neuro-secretory cells were found in *Ascaris* by Gersch & Scheffel, one in each ganglion *nervi papillaris lateralis majoris* [amphidial ganglion]. In some specimens, secretory granules were evenly distributed in the cytoplasm, in others the secretory granules were localized, and in others the granules extended along the two axons leading from each ganglion.

J. C. Pearson

- 1916**—GOFFART, H., 1960. "Die taxonomische Bewertung morphologisch-anatomischer Merkmale bei den Zysten der Gattung *Heterodera* (Nematoda)." **Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft**, No. 99, pp. 24–51.

For ten species of *Heterodera* Goffart gives measurements of the distance between vulva and anus, descriptions of the markings and patterns of the cyst walls and a detailed account of the structure of the vulval cone. Photomicrographs of the ten species illustrate the characters of the cyst wall and vulval region. Only the vulval cone structures are useful for identification of species. He concludes by giving the general characters for the eleven species of *Heterodera* found in Germany.

M. T. Franklin

- 1917**—GRÉTILLAT, S., 1960. [Laboratoire Central de l'Élevage, Dakar, French West Africa.] "Structure anatomique du diverticule pharyngien dans l'espèce *Stephanopharynx compactus* Fiscoeder, 1901 (Trematoda, Paramphistomatidae)." **Comptes Rendus des Séances de l'Académie des Sciences, Paris**, 250 (24), 4064–4066.

Grétilat describes and figures the gross and microscopic structure of the pharyngeal diverticulum of *Stephanopharynx compactus*, and suggests its derivation by coalescence of the paired lateral diverticula present in related amphistomes.

E. I. Sillman

- 1918**—ITO, Y., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on *Trichobilharzia corvi* (Yamaguti, 1941). I. Morphological studies on the adult.] **Japanese Journal of Parasitology**, 9 (5), 556–563. [In Japanese: English summary p. 563.]

Adult *Trichobilharzia corvi* were recovered from the crows, *Corvus corone corone* and *C. coronoides hondoensis* from Shiga, Yamanashi and Hyogo Prefectures. This is the first record of females and paired worms from crows. The infection rate of the adults was 12.2% and of the paired worms was 3.2%. From the morphology of the adult worms Ito concluded that *T. corvi* and *Ornithobilharzia emberizae* were the same species, *O. emberizae* being the female of *T. corvi*.

Y. Yamao

- 1919**—ITO, Y., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on *Trichobilharzia corvi* (Yamaguti, 1941). 2. Studies on the structure of the eggs and miracidia.] **Japanese Journal of Parasitology**, 9 (5), 564–574. [In Japanese: English summary p. 574.]

Ito described the structure of the egg and miracidium of *Trichobilharzia corvi*. There appear to be no marked differences between the miracidia of *T. corvi* and of other blood-flukes of birds.

Y. Yamao

- 1920**—IWASAKI, H., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on the miracidium of *Gigantobilharzia sturniae* (Tanabe, 1948). 1. Morphology of the miracidium of *G. sturniae*.] **Japanese Journal of Parasitology**, 9 (5), 575–581. [In Japanese: English summary p. 581.]

Living miracidia of *Gigantobilharzia sturniae* measure approximately $135.8\mu \times 64.9\mu$. The epidermal cells are arranged in four tiers of six, nine, four and three cells respectively. An intestinal cell is stated to occur in the central part of the body. Three pairs of nerve bands are described and a lateral process and lateral sensory papillae are reported to be present. 19 to 28 germ cells are present in the posterior part of the body.

S. Willmott

- 1921**—IYENGAR, M. O. T., 1957. "Developmental stages of filariae in mosquitoes." **Nouméa, New Caledonia: South Pacific Commission, Technical Paper No. 104**, iii + 11 pp.

Iyengar discusses the characters which differentiate the microfilariae and the three instar larvae of *Wuchereria bancrofti* (non-periodic), *W. malayi* and *Dirofilaria immitis* and illustrates them by photomicrographs, reproduced from various publications, and by a series of original drawings. Mention is also made of other structures which have been mistaken for filaria larvae, e.g. the spores of helicosporous fungi in blood smears, early and late larval forms of *Aphelenchoides parietinus*, contamination of distilled water used in dehaemoglobinizing blood films, and the immature stages of Mermithidae in mosquitoes.

R. T. Leiper

1922—JIMÉNEZ MILLÁN, F., 1960. [Instituto 'López-Neyra' de Parasitología, Sección de Biología Parasitaria, Granada, Spain.] "Revisión de las especies del género *Moniliformis*, parásitas de ratas; con motivo del hallazgo en España de *Moniliformis* en *Epimys norvegicus*, Erx." **Revista Ibérica de Parasitología**, 20 (2), 199-220. [English summary p. 218.]

Jiménez Millán collected specimens of *Moniliformis moniliformis* from *Rattus norvegicus*. This is the first report of this species from Madrid and the second report from Spain. Tables of detailed measurements of each worm indicate the range of measurements of each structure. Comparisons (also in tabular form) of the measurements of these specimens with the measurements of the various species of the genus *Moniliformis* lead to the conclusion that the species *M. dubius*, *M. clarki* and *M. moniliformis* are essentially the same. W. L. Bullock

1923—KOMIYA, Y., YOSHIDA, Y. & TOMIMURA, T., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] "The excretory system, particularly its flame cell pattern of *Paragonimus iloktsuenensis* Chen, 1940." **Japanese Journal of Medical Science and Biology**, 13 (3), 155-159.

Komiya *et al.* describe and figure the excretory system of the larval forms of *Paragonimus iloktsuenensis*. The flame cell pattern of the daughter rediae is represented as $2[(2+2)+(2+2)]$, and that of the cercariae and metacercariae as $2[(3+3+3+3+3)+(3+3+3+3+3)]$. The authors compare the flame cell pattern of *P. iloktsuenensis* with those of *P. westermani* and *P. ohirai*. The taxonomic importance of the flame cell pattern is discussed. J. W. Smith

1924—KOMIYA, Y., YOSHIDA, Y. & TOMIMURA, T., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [The excretory system of the larvae of *Paragonimus iloktsuenensis*.] **Japanese Journal of Parasitology**, 9 (5), 515-518. [In Japanese: English summary p. 518.]

Komiya *et al.* studied the excretory system of the larvae of *Paragonimus iloktsuenensis*, with special reference to the flame cell pattern. The flame cell pattern of the daughter redia could be represented basically as the formula $2[(2+2)+(2+2)]$, when the flame cell pattern of both the cercaria and metacercaria was $2[(3+3+3+3+3)+(3+3+3+3+3)]$. Y. Yamao

1925—LOGACHEV, E. D., 1958. [Gelmintologicheskaya laboratoriya Akademii nauk SSSR, Kemerovskii meditsinskiy institut, U.S.S.R.] [The morphology of the connective tissue of the larval forms of cestodes.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 206-208. [In Russian.]

Studies of the connective tissue of *Cysticercus cellulosae* showed that cellular elements had the same mode of development as in the adult parasite. There was, moreover, a thick layer of morphologically distinct fibrous connective tissue, disposed circularly between the cyst wall and the inverted scolex. This specialized layer consisted of densely placed, more or less parallel desmocytes. The protoplasm of these appeared to consist only of ectoplasm and the small oval nuclei stained intensely which distinguished them from the vesicular nuclei of desmocytes in the connective tissue of adult cestodes. N. Jones

1926—LUBINSKY, G., 1960. "The variability of the number of rostellar hooks in two species of *Echinococcus* from North America." **Canadian Journal of Zoology**, 38 (3), 605-612.

Lubinsky has shown that the number of rostellar hooks in *Echinococcus multilocularis sibiricensis* and *E. granulosus* (Canadian variety) is extremely variable. In six populations of the first species 90% had from 20 to 32 hooks (average 28), while in nine populations of the second species, 90% had from 28 to 40 hooks (average 32). The variation found in the Canadian variety of *E. granulosus* corresponds to the limits pointed out by Leuckart for European *E. granulosus*. Lubinsky states that the value of the number of hooks in the taxonomy of this genus is debatable. G. A. Webster

1927—MISAKI, S., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on the fine structure of cercariae of *Trichobilharzia physellae* (Talbot, 1936) and *Trichobilharzia ocellata* (La Valette, 1855).] **Japanese Journal of Parasitology**, 9 (6), 744-759. [In Japanese: English summary p. 759.]

Misaki made a detailed study of the structure of the cercariae of *Trichobilharzia physellae* and *T. ocellata*, known to cause dermatitis in Japan. He found that there was little difference in the fine structures of both cercariae. Y. Yamao

1928—MÜLLER, G. L., 1959. "On the differential diagnosis of the third stage (infective) larvae of *Chabertia ovina* and *Oesophagostomum* spp. (*O. columbianum* and *O. venulosum*) with special emphasis on the characteristic lengths of *C. ovina*." **Journal of the South African Veterinary Medical Association**, 30 (4), 427-435.

Measurements of 210 *Chabertia ovina* larvae were made and compared with those of *Oesophagostomum columbianum* larvae. Histograms and tables including references to other authors are included. Müller concludes that the main criterion for routine examination is total length, all larvae with a total length below 791μ being *C. ovina* and longer larvae *Oesophagostomum* spp. Other criteria are: length from anus to tip of sheath, less than 202μ in *C. ovina*, more than 202μ in *Oesophagostomum*; length from tip of larval tail to tip of sheath in *C. ovina* less than 74μ and greater than 74μ for the other species; the number and shape of the intestinal cells, e.g. in *C. ovina* there are 26 to 32 rectangular, ill defined cells, whereas in *O. columbianum* there are 16 to 24 triangularly shaped cells. Other measurements such as oesophageal length and length of intestinal cell groups are also given.

R. K. Reinecke

1929—MULVEY, R. H., 1960. [Nematology Section, Entomology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Canada.] "Abnormalities in second-stage larvae of *Heterodera trifolii* Goffart, 1932 (Nematoda: Heteroderidae)." **Canadian Journal of Zoology**, 38 (4), 777-779.

Mulvey recorded and photographed giant and small larvae of *H. trifolii* and also larvae showing abnormal tail shape and stylet conformation.

A. M. Shepherd

1930—PETERS, L. E., 1960. [Department of Biological Sciences, Purdue University, Lafayette, Indiana, U.S.A.] "The systematic position of the genus *Dihemistephanus* Looss, 1901 (Trematoda: Digenea), with the redescription of *D. lydiae* (Stossich, 1896) from the South Pacific." **Proceedings of the Helminthological Society of Washington**, 27 (2), 134-138.

A revised diagnosis of the genus *Dihemistephanus* Looss, 1901 is given, together with a redescription of the type and only species, *D. lydiae* (Stossich, 1896). *Dihemistephanus* is transferred from the Acanthocolpidae to the Lepocreadiidae because it has a distinct seminal receptacle and an external seminal vesicle.

M. Beverley-Burton

1931—PITCHFORD, R. J. & VISSER, P. S., 1960. [Bilharzia Field Unit, South African Council for Scientific & Industrial Research, Nelspruit, Transvaal, South Africa.] "Some observations on *Schistosoma mansoni* in rodents in the Transvaal." **Annals of Tropical Medicine and Parasitology**, 54 (2), 247-249.

The type of egg named *Schistosoma mansoni* var. *rodentorum* which occurs in wild rodents at Komatiport in the Transvaal and has been recorded from the Belgian Congo by Schwetz in 1953 and 1956 [for abstracts see Helm. Abs., 22, No. 76d and 25, No. 147d] is probably only an abnormal form of the egg of *Schistosoma mansoni* modified by its adaptation to its environment, as the shape varies with variations in the diet of the same rodent species.

R. T. Leiper

1932—PRICE, E. W., 1960. [Jacksonville State College, Jacksonville, Alabama, U.S.A.] "A note on *Ogmocotyle ailuri* (Price, 1954) (Trematoda: Notocotylidae)." **Proceedings of the Helminthological Society of Washington**, 27 (2), 119-121.

A description is given of *Ogmocotyle ailuri* (Price, 1954) based on material recovered from a lesser panda, *Ailurus fulgens*, which died in the Zoological Park, Washington, D.C. Through a lapsus, this species had previously been placed in the genus *Ogmogaster*. *Ogmocotyle ailuri* closely resembles *O. indica* (Bhalerao, 1948) and the two species may eventually be found to be synonymous. The cirrus sac in *O. ailuri* is reported to be situated more transversely than in *O. indica*.

M. Beverley-Burton

1933—SARWAR, M. M., 1958. [College of Animal Husbandry, Lahore, West Pakistan.] "Digestive tract of cercaria of *Fasciola gigantica*." **Biologia. Lahore**, 4 (1), 1-7.

Whereas Bhalerao (1935) and Thapar & Tandon (1952) described and figured the two intestinal caeca of the cercaria of *Fasciola gigantica* as unbranched and terminating near the ventral

sucker, Sarwar finds that the gut is represented by two chains of granular masses constantly six in each row, stretching from the oral sucker to the hind end of the cercarial body but located near its dorsal surface.

R. T. Leiper

1934—TAYLOR, A. E. R., 1960. [National Institute for Medical Research, Mill Hill, London, England.] "Studies on the microfilariae of *Loa loa*, *Wuchereria bancrofti*, *Brugia malayi*, *Dirofilaria immitis*, *D. repens* and *D. aethiops*." **Journal of Helminthology**, **34** (1/2), 13–26.

Taylor studied the anatomy of microfilariae of various species using phase contrast, ultra-violet microscopy and vital staining techniques, which revealed some hitherto unrecorded structures. The nerve ring in *Mf. loa* and in most of the other species appears to consist of two cells and the cytoplasm of each cell extends anteriorly and posteriorly as filamentous projections. There is a hook-like structure at the head end attached to two large cephalic cells which appear to be responsible for the movement of the hook and hence are renamed "hook-muscle cells", a term which replaces the "roten Mundgebilde" of Fülleborn. As regards the excretory apparatus, the cytoplasm of the excretory cell envelopes the excretory vesicle and extends anterior to it. (In *Mf. loa* this apparatus is more complicated than in the other species, especially in the structure of the vesicle.) Similarly the cytoplasm of the G₄ cell envelopes the anal vesicle, in the species studied—a hitherto unrecorded observation. The importance of ultra-violet photomicrographs is pointed out; these give more impartial pictures than visual ones or electron micrographs. *Mf. loa* and *Mf. immitis* when stored at –79°C. remained alive (50% to 80%) after four to seven days but became vacuolated; those which had been stored at room temperature in well oxygenated blood retained normal appearance.

J. J. C. Buckley

1935—TRIANTAPHYLLOU, A. C. & SASSER, J. N., 1960. [Department of Plant Pathology, North Carolina Agricultural Experiment Station, Raleigh, North Carolina, U.S.A.] "Variation in perineal patterns and host specificity of *Meloidogyne incognita*." **Phytopathology**, **50** (10), 724–735.

The authors studied the perineal patterns of specimens from pure line cultures of individuals from 14 isolates of the *Meloidogyne incognita* group, some having predominantly *incognita*-type and some *acrita*-type patterns. After propagation for 10 to 12 generations on tomato no change was observed in the pattern characteristics. Propagation of individuals selected in each generation for a particular pattern characteristic did not alter the general population characteristics. The patterns in young females had fine wavy lines of the *incognita* type, while egg-laying individuals had coarser lines with folding of the cuticle. The host specificity of the 14 lines was tested on ten plant species and varieties. Half the isolates reproduced on cotton, irrespective of the pattern type. All isolates reproduced on maize and on resistant tomato (Hawaii 5229) to a slight extent. Tests of tobacco DB-101 and two resistant breeding lines showed reproduction of all isolates on DB-101 but only isolates with the *incognita*-type pattern reproduced slightly on the resistant lines. Clones of the nematode capable of moderate parasitism on resistant tobacco or tomato were produced by propagation for several generations on these plants. The results of the studies suggest that for taxonomic purposes the perineal patterns examined should be selected from egg-laying females only, and that all populations having patterns ranging from the *incognita* to the *acrita* type should be considered as one species, *M. incognita*.

M. T. Franklin

1936—WILLMOTT, S., 1960. [Commonwealth Bureau of Helminthology, The White House, 103 St. Peter's Street, St. Albans, Herts, England.] "The morphology of *Brumptia bicaudata* (Poirier, 1908) Odhner, 1926 (Trematoda: Paramphistomoidea)." **Proceedings of the Zoological Society of London**, **134** (4), 623–634.

Willmott redescribes and redefines *Brumptia bicaudata*, with special reference to the genitalia. When invaginated, the genital papilla is shown to form the hermaphroditic pouch. Two unique features are described in this paramphistome for the first time: a ciliated valve separating the vesicula seminalis and ejaculatory duct, and ciliation of the epithelial lining of the ejaculatory duct.

E. I. Sillman

1937—YOKOGAWA, M., YOSHIMURA, H. & KOMIYA, Y., 1960. [Department of Parasitology, School of Medicine, Chiba University, Chiba, Japan.] [On the morphology of the larval forms of *Paragonimus ohirai* Miyazaki, 1939.] **Japanese Journal of Parasitology**, 9 (5), 451-456. [In Japanese: English summary p. 456.]

A detailed morphological description was given of second generation rediae, cercariae and metacercariae of *Paragonimus ohirai*, with special reference to the excretory system. A comparison was made with those of *P. westermani*, *P. kellicotti* and *P. iloksuenensis* and it was established that the rediae, cercariae and metacercariae of *P. ohirai* could be differentiated from those of other lung-flukes.

Y. Yamao

Life-History and Development

1938—ANDERSON, R. C., 1960. [Department of Parasitology, Ontario Research Foundation, 43 Queen's Park, Toronto 5, Ontario, Canada.] "On the development and transmission of *Cosmocercoides dukae* of terrestrial molluscs in Ontario." **Canadian Journal of Zoology**, 38 (4), 801-825.

Anderson describes in detail, with the aid of 35 figures, all stages in the life-cycle of a nematode, tentatively referred to as *Cosmocercoides dukae*, from the mantle cavity of *Discus cronkhitei*, *Zonitoides arborea* and *Deroceras gracile* and the rectum of *Rana* spp., *Bufo americanus* and *Ambystoma jeffersonianum* in Ontario. There were no morphological differences between the nematodes from each of these hosts. In molluscs, the female *C. dukae* deposit third-stage larvae which leave the mantle cavity and appear in snail slime trails; when placed on the foot of snails these larvae enter the respiratory pore and develop in the mantle cavity. Larvae develop to the infective stage in the uterus of the female worm. Larvae were found in the genital tract and ovary of slugs and in the eggs of both snails and slugs. All stages of *C. dukae* can survive in tap-water or invertebrate saline. Nematodes of all stages from infected molluscs fed to *Rana pipiens* were passed at intervals in the faeces; there is no evidence to suggest that *C. dukae* can establish itself in amphibians. The occurrence of cosmocercids in amphibians may be due to the latter eating infected molluscs, the nematodes surviving the passage through the gut.

J. W. Smith

1939—BABERO, B. B., 1960. [Department of Biology, Southern University, Baton Rouge, Louisiana, U.S.A.] "On the migration of *Ascaris laevis* Leidy, 1856 in some experimentally infected hosts." **Transactions of the American Microscopical Society**, 79 (4), 439-442.

Babero demonstrated that the migratory cycle of *Ascaris laevis* was almost four times longer than that of *A. lumbricoides*. Less than 24 hours after feeding from 200 to 5,000 embryonated *A. laevis* eggs to experimental hosts (ground squirrels, guinea-pigs, woodchucks, mice, hamsters and cats) second-stage larvae were observed in the liver. The larvae remained within the liver for about 34 days before being transported by the hepatic and postcaval veins to the right side of the heart, and from there to the lungs where they remained only briefly before migrating to the intestine. Larvae were found in the lungs in a minimal time of 34 days and in the intestine in 42 days. Early fourth-stage larvae were occasionally observed in the liver. The seasonal activity and physiology of the normal hibernating rodent hosts (ground squirrels and woodchucks) may regulate the speed at which *A. laevis* can mature.

J. W. Smith

1940—BODDEKE, R., 1960. [Faculty of Science, University of Amsterdam, The Netherlands.] "The life history of *Prosthogonimus ovatus*. I. Experiments in birds." **Tropical and Geographical Medicine, Amsterdam**, 12 (3), 263-292. [Spanish summary p. 289.]

In this the first of three papers on the life-history of *Prosthogonimus ovatus* Boddeke discusses the results of extensive experiments of infecting starlings, jackdaws, crows, Peking ducks, Khaki Campbell ducks, White Leghorn and Rhode Island Red chickens with the encysted metacercariae of *P. ovatus* from *Cordulia aenea*. Photomicrographs, figures and measurements of adult *P. ovatus* recovered from each of these hosts are given. As a result of these studies Boddeke emends *P. ovatus* Rudolphi, 1803 to include all species of *Prosthogonimus* described from Europe and Asia [for list of these species see abstract No. 1942 below]. The author considers that the differences between specimens are due to host modifications. Transplantation experiments show that while the worm inhabits the fabrician sac of the host, its oral sucker remains small; when in the oviduct of the host the oral sucker increases in size.

Both the ventral and oral sucker are used for movement in the oviduct; in the fabrician sac movement is restricted, the ventral sucker being used for clinging rather than for creeping. The rate of growth of *P. ovatus* depends on the season, the number and age of the worms, the organ affected and the host species. 138 references are given. [For abstracts of the second and third papers by Boddeke on the life-history of *P. ovatus* see Nos. 1941 & 1942 below].

J. W. Smith

1941—BODDEKE, R., 1960. [Faculty of Science, University of Amsterdam, The Netherlands.] "The life history of *Prosthogonimus ovatus*. II. The intermediate hosts." **Tropical and Geographical Medicine, Amsterdam, 12** (4), 363–377. [Spanish summary p. 377.]

In his second paper on the life-history of *Prosthogonimus ovatus* Boddeke describes the development of the sporocyst and the cercariae within the first intermediate host *Bithynia tentaculata*. The infection of *B. tentaculata* by ingestion of embryonated ova of *P. ovatus*, successfully carried out experimentally, probably takes place in nature. Statistical analysis of the distribution of encysted metacercariae among the second intermediate host, *Cordulia aenea* larvae, shows that the cercariae do not actively search for a host, but are passively drawn in by the respiratory currents. Apart from *C. aenea* other anisopteran larvae which can act as second intermediate hosts include *Aeshna cyanea*, *Leucorrhinia caudalis*, *L. pectoralis*, *Libellula quadrimaculata* and *Orthetrum cancellatum*. Results of the successful experimental infection of dragon-fly larvae with cercariae of *P. ovatus* are included. A description of the encysted metacercariae and the process of excystation in 0.5% trypsin solution is given; at 45°C. complete disappearance of the cystic wall took at least two to five hours. Photomicrographs are given of the cercaria and the encysted and excysted metacercaria. [For abstracts of the first and third papers by Boddeke on the life-history of *P. ovatus* see Nos. 1940 above & 1942 below.]

J. W. Smith

1942—BODDEKE, R., 1960. [Faculty of Science, University of Amsterdam, The Netherlands.] "The life history of *Prosthogonimus ovatus*. III. Taxonomy and economical aspects." **Tropical and Geographical Medicine, Amsterdam, 12** (4), 378–387. [Spanish summary p. 386.]

In this last paper on the life-history of *Prosthogonimus ovatus* Boddeke presents a critical consideration of the characteristics on which the taxonomy of *Prosthogonimus* is based and concludes that the proportion between the diameter of the ventral and oral sucker is the only useful characteristic in differentiating the species providing the worms are of comparable age and are from the same host developed in the same season. As a consequence Boddeke emends *P. ovatus* Rudolphi, 1803 to include the following species of *Prosthogonimus* described by various authors from Europe and Asia: *P. anatinus*, *P. brauni*, *P. cuneatus*, *P. dogieli*, *P. dollfusi*, *P. fülleborni*, *P. furcifer*, *P. horiüchii*, *P. hyderabadensis*, *P. indicus*, *P. japonicus*, *P. karausiaki*, *P. ketupi*, *P. longus morbificans*, *P. leeii*, *P. macroacetabulus*, *P. mesolithicus*, *P. orientalis*, *P. ovatus*, *P. pellucidus*, *P. penni*, *P. pseudopellucidus*, *P. putschkowski*, *P. querquedulae*, *P. rudolphii*, *P. sinensis*, *P. singhii* and *P. skrjabini*. *P. macrorchis* Macy (probably identical with *P. folliculus* Reid & Freeman) may be maintained as a valid species on the basis of the proportion between the oral and ventral suckers being constant at 1:1.7–1.8. Detailed study of the life-cycle and development of *P. vitellatus* Nicoll may establish this species as distinct from *P. ovatus*. The tolerance shown to prosthogonimiasis is much weaker in White Leghorn than in Rhode Island Red hens; therefore, the author recommends the breeding of the latter species in areas where *P. ovatus* infection is common. The factors leading up to an outbreak of prosthogonimiasis are discussed in detail. A summary of the life-cycle of *P. ovatus* is given. [For abstracts of the first and second papers by Boddeke on the life-history of *P. ovatus* see Nos. 1940 and 1941 above].

J. W. Smith

1943—BRANGHAM, A. N., 1960. [Four Ways, 85 Claremont Road, Tonbridge Wells, Kent, England.] "Notes on ant vectors in the life-cycle of a trematode." **Entomologist's Monthly Magazine, 96**, 54–56.

Brangham reviews the evidence for regarding *Formica fusca* as an obligatory second intermediate host in the life-cycle of *Dicrocoelium dendriticum*. That other ants may act as auxiliary second intermediate hosts is a concept arising from the fact that the *fusca* group of ants are

widely parasitized by *F. sanguinea*, other *Formica* species, and *Polyergus rufescens*. Both species in such relationships could therefore become transmitters of the parasite through regurgitation of the encysted cercariae by the foraging ants and subsequent ingestion of them by the host ants. Brangham refers to the work of Vogel & Falcão on the experimental feeding of cysts to ants in artificial colonies [for abstract see Helm. Abs., 23, No. 533a]. J. W. Smith

1944—BUTTNER, A. & VACHER, C., 1960. [Institut de Parasitologie, Faculty de Médecine, 15 rue de l'Ecole de Médecine, Paris, France.] "Recherches sur le développement et l'identification de *Plagiorchis* (*Multiglandularis*) *cirratus* (Rudolphi 1802). I. Etude du cycle évolutif." **Annales de Parasitologie Humaine et Comparée**, 35 (3), 268–281.

Buttner & Vacher report more fully on the life-history and larval stages of *Plagiorchis cirratus* [for previous abstract see Helm. Abs., 30, No. 301]. Data on the known life-histories of those species of *Plagiorchis* (subgenera *Plagiorchis* and *Multiglandularis*) in which the xiphidiocercariae encyst in aquatic arthropods is tabulated. It is indicated that for these species the first intermediate host is usually a pulmonate gastropod and less often a prosobranch gastropod. In nature the definitive hosts are probably birds and mammals except for amphibians in the case of *P. (P.) ramlianus*. E. I. Sillman

1945—CANARIS, A. G., 1960. [Zoology Department, Oregon State College, Corvallis, Oregon, U.S.A.] "A cestode life cycle involving land snails and shrews." **Journal of Parasitology**, 46 (4), 524.

Canaris found cysticercoids of *Liga soricis* in five species of snails, namely, *Haplotrema sportella*, *H. vancouverensi*, *Vespericola columbiana*, *Triodopsis germana* and *Allogona townsendiana*, and the adult tapeworm in the small intestine of *Sorex vagrans*, the wandering shrew. Shrews are considered to become parasitized by eating infected snails. Attempts at experimentally infecting white mice, white rats, golden hamsters and chickens were unsuccessful except on two occasions when two immature tapeworms were recovered from the golden hamster. I. L. Owen

1946—CHENG, T. C., 1960. [Department of Biology, Lafayette College, Easton, Pennsylvania, U.S.A.] "The life history of *Brachycoelium obesum* Nicoll, 1914, with a discussion of the systematic status of the trematode family Brachycoeliidae Johnston 1912." **Journal of Parasitology**, 46 (4), 464–474.

Cheng describes and illustrates life-history stages of *Brachycoelium obesum* from natural and laboratory infections. First and second generation sporocysts, cercariae and metacercariae were recovered from the hepatopancreas of experimentally infected *Zonitoides ligerus* and *Agriolimax agrestis* from 13 to 20 days after ingestion of the trematode ova. The short-tailed xiphidiocercariae do not encyst in the intermediate host and the definitive host becomes infected on ingestion of the infected gastropods. Young adults were recovered from pre-starved *Triturus v. viridescens* fed metacercariae in molluscan tissue. Cheng reaffirms the status of the Brachycoeliidae, Plagiorchiidae and Dicrocoeliidae as independent families subordinate to the superfamily Plagiorchioidea Dollfus, 1930, and suggests that La Rue's (1957) description of cercariae of members of the order Plagiorchiidae La Rue, 1957 should read "... encysted or nonencysted metacercariae in invertebrates, rarely in vertebrates". E. I. Sillman

1947—CRANDALL, R. B., 1960. [Department of Biological Sciences, Purdue University, Lafayette, Indiana, U.S.A.] "The life history and affinities of the turtle lung fluke, *Heronimus chelydrae* MacCallum, 1902." **Journal of Parasitology**, 46 (3), 289–304, 305–307.

Crandall reports that miracidia of *Heronimus chelydrae* penetrate *Physa integra* and develop into a branched sporocyst which produces amphistomate cercariae, directly, in about 20 days. Cercariae do not emerge or encyst; turtles acquire the parasite by ingesting infected snails. In the turtle, released cercariae migrate to the lungs via the trachea. The unique position of the excretory pore, dorsal and far toward the anterior end of the fully grown adult, is shown to be due to elongation of the postero-ventral region during the pre-adult growth period. The well developed ventral sucker at the posterior end of the cercaria degenerates and disappears in the adult within 90 days. Life-history stages are figured and described. Failure to find eggs or miracidia in dejecta from lungs, respiratory passages and digestive tracts of

turtles, occurrence of gravid worms in the lungs during June and July, and the occasional finding of gravid worms in bronchi and tracheae in early summer, suggests the worms overwinter in the lungs, then migrate through the respiratory passages to water to release the miracidia. Crandall argues the species is sufficiently unique in morphology and development to merit separate family status, and reaffirms its affinities with the superfamily Paramphistomatoidea.

E. I. Sillman

1948—DAWES, B., 1960. [Department of Zoology, King's College, London, W.C.2, England.] "Elucidation of the life-cycle of *Fasciola hepatica*." [Correspondence.] *Nature*. London, 185 (4709), 331-332.

Dawes agrees with Jeffries [for abstract see No. 1960 below] on the subject of Steenstrup's contribution to parasitology. Following a discussion of the relative accuracy of the early work by Steenstrup, Müller, de Filippi, Bojanus, Nitzsch, Creplin and Weinland it is pointed out that Steenstrup "did not even mention the larval stages of the liver-fluke, and in fact he did not describe any trematode life-cycle in its entirety".

J. W. Smith

1949—DOLLFUS, R. P., 1959 & 1960. "Recherches expérimentales sur *Nicolla gallica* (R.-Ph. Dollfus 1941) R.-Ph. Dollfus 1958, sa cercaire cotylicerque et sa métacercarie progénétique. Observations sur la famille des Coitocaecidae Y. Ozaki 1928, s.f. Coitocaecinae F. Poche 1926, Trematoda Podocotyloidea et sur les cercaires cotylicerques d'eau douce et marines." *Annales de Parasitologie Humaine et Comparée* 34 (5/6), 595-622; 35 (1/2), 65-117.

In the first part of a paper dealing with all aspects of the biology of *Nicolla gallica*, originally designated as *Coitocaecum gallicum*, the adult is redescribed in more detail; notes are given on the natural incidence of *N. gallica* in *Cottus gobio* and on the results of experiments to infect *Anguilla anguilla* and *Salmo irideus*; naturally encysted metacercariae from *Echinogammarus berilloni* and *Gammarus pulex* are described; the progenicity of the metacercariae is discussed; the cercariae are described; notes are given on experimental infections of *G. pulex*; the position of *Nicolla* in the Coitocaecidae is discussed and a list given of marine and fresh-water species of the genera *Coitocaecum* and *Nicolla* with details of their geographical distribution. In the second part of the paper the features characteristic of the cotylocercous group of cercariae are reviewed; a list and brief notes on previously described fresh-water cotylocercous cercariae are given together with a table indicating their hosts and geographical distribution; a list and brief notes on previously described marine cotylocercous cercariae are given together with a table indicating their hosts and geographical distribution; the families and genera contained in the superfamily Podocotyloidea are discussed.

M. Beverley-Burton

1950—GINETSINSKAYA, T. A. & KOSHEVA, A. F., 1959. [The life-cycle and systematic position of *Paracoenogonimus ovatus* Katsurada (Trematoda) and the identity of its metacercariae with those of *Neodiplostomulum hughesi* Markevich.] *Vestnik Leningradskogo Universiteta. Seriya Biologii*, 14 (9), 68-75. [In Russian: English summary p. 74.]

Ginetsinskaya & Kosheva used cercariae (morphologically identical with those described by Komiya in 1938 for *Paracoenogonimus ovatus*) from *Viviparus viviparus* and *V. contectus* to infect several species of fish. The metacercariae, which developed in 30 days, were identical with those described by Markevich in 1934 as *Neodiplostomulum hughesi*. The metacercariae were then fed to rats, kittens and *Larus ridibundus*. The worms were immature in the rats killed after 20 and 62 hours but those in the kittens and gulls were identified as *P. ovatus*. The authors describe the larval stages and give the distribution and hosts of this species in Russia. They then review its systematic position in view of their own material. Two species of cercariae were present in *V. viviparus*: *Cercaria monostomi viviparae* (Szidat, 1936) with 24 protonephridia, which encysts in the mantle of these snails but never in fish (its further development could not be traced), and *C. paracoenogonimus ovatus* (Komiya, 1938) with 36 protonephridia, which encysts only in fish and later develops to *P. ovatus*. The authors therefore do not agree with Sudarikov, 1956 [for abstract see Helm. Abs., 25, No. 543t] who, having shown that *Linstowiella viviparae* is identical with *P. ovatus*, accepts that *C. monostomi viviparae* is the cercaria of *L. viviparae* (an identification made on Szidat's incomplete experiment) and names the species *P. viviparae* n.comb. Its correct name is therefore *P. ovatus* (syn. *L. viviparae*).

G. I. Pozniak

1951—GRÉTILLAT, S., 1959. "Recherches sur le cycle évolutif de *Carmyerius dollfusi* Golvan, Chabaud et Grétilat, 1957 (Trematoda, Gastrothylacidae) à Madagascar." *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, **248** (12), 1873–1875.

In Madagascar *Carmyerius dollfusi* is a common parasite in the zebu. The miracidium develops in 15 to 20 days and in *Bulinus mariei* produces rediae and daughter rediae. The cercaria is strongly pigmented and has small eye-spots. After leaving the molluscan host it rapidly encysts on aquatic plants. 72 encysted metacercariae were administered to a young calf and 51 sexually mature *C. dollfusi* were collected at post-mortem 76 days later. Grétilat adds that during dissections of *B. mariei* furcocercariae also were frequently noticed. R. T. Leiper

1952—GUILHON, J., 1960. [Laboratoire de Parasitologie, Ecole Nationale Vétérinaire d'Alfort, France.] "Rôle des Limacides dans le cycle évolutif d'*Angiostrongylus vasorum* (Baillet, 1866)." *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, **251** (20), 2252–2253.

Molluscs of the genus *Arion* were collected in the south-west of France where *Angiostrongylus vasorum* is endemic (in kennels 30% to 80% of dogs were infected) and were fed to three dogs born at Alfort and Paris, far from the endemic zone. The first dog, aged four months, received 25 molluscs and died 14 days later of a virus infection; no trace of larval or adult *A. vasorum* could be found. The second dog, aged three years, received 14 molluscs over three days; it died 48 days after the first feed after showing dyspnoea and weight loss for 12 days. 10 mature and 83 immature males and 185 mature and 11 immature females of *A. vasorum* were counted from the right side of the heart. The lungs were dark red with light patches containing eggs but no larvae. The third dog, aged 20 months received a total of 34 molluscs over the period 10th to the 15th of September. On the 21st of October a dry cough started and the usual symptoms became progressively more pronounced. On the 3rd of November larvae appeared in the faeces. On the 6th of November the dog died. Autopsy showed 1,206 ovigerous females and 615 well developed males in the right heart and ramifications of the pulmonary artery; numerous early larvae were present in the lungs, bronchi, trachea and digestive tract. This is the first experimental evidence of the need for at least one obligatory intermediate host in the life-cycle of *A. vasorum*. W. M. Fitzsimmons

1953—HONER, M. R., 1960. [Institute for Veterinary Parasitology & Parasitic Diseases, State University, Utrecht, The Netherlands.] "Some observations on *Leucochloridium paradoxum* (= *macrostomum*) Rud. 1802, from the snail *Succinea putris* L." *Bacteria, Amsterdam*, **24** (4/5), 52–59. [Dutch summary p. 59.]

Honer gives a very brief anatomical description of a single specimen of *Succinea putris*. He then gives a full illustrated description (including measurements) of three sporocysts and their contents of *Leucochloridium paradoxum* (= *macrostomum*) that he found in the visceral mass of the snail. The sporocysts were of the "green-sac" variety with a "clumped" distribution of pigment and contained respectively 61, 97 and 112 cercariae. Each cercariaeum was surrounded by a thick transparent cuticle with a connecting channel between the suckers and the cuticular surface, which suggests that the larva may feed on neighbouring larvae, as is the case with many rediae. The author speculates on the problem of the entry of the parasite into its definitive host. J. W. Smith

1954—HONER, M. R., 1960. [Institute for Parasitology & Parasitic Diseases, State University, Biltstraat 172, Utrecht, The Netherlands.] "*Diplodiscus* species parasitic in the snail *Paludina vivipara* Lm." [Correspondence.] *Nature, London*, **187** (4735), 431–432.

Several specimens of *Paludina vivipara* collected by Honer were infected with the rediae and adults of a species of *Diplodiscus* closely resembling *D. subclavatus*. This is the first record of *P. vivipara* acting as intermediate host for this group of trematodes. Cercariae were not emitted under laboratory conditions. Measurements and a photograph of the adult are given. Honer suggests that the snail may have eaten the encysted metacercariae of *Diplodiscus* sp., the larval stages having taken place in another mollusc. Alternatively, the whole of the life-cycle may have occurred within the (former) intermediate host thus accounting for the absence of free-swimming cercariae. The cercariae of *D. subclavatus* (*Cercaria diplocotylea*)

develop within the tissues of *Planorbis umbilicatus*, but they encyst externally. The present parasite could either be a parasite of molluscs, or a parasite of vertebrates which has adapted itself to a molluscan host. [Results of further work on this trematode have since been published in **Z. Parasitenk.**, 20, 489-494.] J. W. Smith

1955—IKSANOV, K. I., 1958. [Institut zoologii i parazitologii, Akademiya nauk Kirgizskoi SSR.] [Study of eustrongylid larvae from fish in the Issyk-Kul lake.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 143-144. [In Russian.]

Eustrongylides sp. larvae from four fish species from the Issyk-Kul lake, were fed to ducks, pigeons, sea-gulls and terns. Within two to four hours they were embedded in the wall of the proventriculus which they subsequently perforated. The larvae moulted once more before becoming sexually mature. N. Jones

1956—ITO, J., 1960. [Hygiene Laboratory, Faculty of Education, Shizuoka University, Shizuoka, Japan.] "Studies on the morphology and life cycle of *Pseudobilharziella corvi* Yamaguti, 1941 (Trematoda: Schistosomatidae)." **Japanese Journal of Medical Science and Biology**, 13 (1/2), 53-58.

A furcocercous cercaria from *Semisulcospira libertina*, identified with Yoshida's "Cercaria G" and renamed *Cercaria scripta* by Faust (1924), when injected into *Gallus gallus domesticus* gave rise to adults of *Pseudobilharziella corvi*. The sporocysts, cercariae and adult males are described and figured. Although many males were recovered no females were found. The cercaria has two large pigmented eye-spots and the flame cell formula is $2[(1+1+1)+(1+1+[1])]=12$. Ito notes that Yoshida erroneously described a pharynx in the cercaria and mistook the sporocyst for a redia. R. T. Leiper

1957—IVASHKIN, V. M. & RIZHIKOV, K. M., 1958. [Laboratoriya gelmintologii, Akademiya nauk SSSR, Moskva, U.S.S.R.] [The study of the biological cycles of nematodes.] **Priroda.** Moscow, Year 1958, No. 8, pp. 63-65. [In Russian.]

1958—IWAKAMI, S., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on schistosome dermatitis in Dozen region in Oki Islands. 1. The development of *Trichobilharzia physellae* in *Lymnaea japonica* found in Oki Islands.] **Japanese Journal of Parasitology**, 9 (6), 760-767. [In Japanese: English summary p. 767.]

Iwakami investigated the development of sporocysts and cercariae of *Trichobilharzia physellae* in *Lymnaea japonica*. The sporocyst in the snail was similar to those reported by Cort *et al.* in 1955 [for abstract see *Helm. Abs.*, 24, No. 29a]. A PAS-positive substance appeared in daughter sporocysts which contained cercariae measuring more than 0.04 mm. \times 0.033 mm. The penetration gland with its ducts and the escape gland of completely developed cercariae were filled with PAS-positive granules. The author states that the PAS-positive granules were considered to be related to the mechanism of cercarial emergence from the snail. Y. Yamao

1959—IWASAKI, H., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on the miracidium of *Gigantobilharzia sturniae* (Tanabe, 1948). 3. Egg development of *G. sturniae* (Tanabe, 1948).] **Japanese Journal of Parasitology**, 9 (5), 589-595. [In Japanese: English summary p. 595.]

Iwasaki studied the embryology and cytology of the miracidia of *Gigantobilharzia sturniae*. The apical gland cell was differentiated at the end of the morula stage and showed a strong PAS-positive reaction. Y. Yamao

1960—JEFFRIES, H. S., 1960. [16, Ashley Road, Bradford on Avon, Wiltshire, England.] "Elucidation of the life-cycle of *Fasciola hepatica*." [Correspondence.] **Nature, London**, 185 (4709), 331. Jeffries, in correspondence, points out that the life-histories of several trematodes, including that of *Fasciola hepatica* were accurately described by Steenstrup (1845) nearly 40 years before the work of Leuckart and Thomas [but see abstract No. 1948 above]. J. W. Smith

1961—KARMANOVA, E. M., 1958. [Gelmintologicheskaya Laboratoriya AN SSSR.] [On the biology of nematodes of the suborder Dioctophymata (Skryabin, 1927).] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 148–151. [In Russian.]

While dealing with the biology and morphology of Dioctophymata, Karmanova concludes that (i) these nematodes have four larval stages and one adult stage; (ii) they have only one intermediate host—Oligochaeta; (iii) fish act as reservoir hosts; (iv) the nematodes moult three times in the body of the intermediary and once in the definitive host; and (v) the life-cycle of Dioctophymata is remarkable for its length.

N. Jones

1962—KATZ, F. F., 1960. [Jefferson Medical College, Philadelphia, Pennsylvania, U.S.A.] "The oral transplantation of intestinal stages of *Trichinella spiralis*." **Journal of Parasitology**, **46** (4), 500–504.

Experiments have been performed to determine when the intestinal phase of the life-cycle of *Trichinella spiralis* can be transplanted from one mouse to another by oral administration. The success was determined by the recovery of larvae from the musculature and small intestine of the recipient mice. The results show that muscle infections were obtained in all the recipient mice fed worms which had been in the donor mice for five hours. Neither intestinal nor muscle infections were demonstrated for worms transplanted 24 or 28 hours beyond the infective muscle stage. Muscle larvae were recovered from the majority of mice inoculated with 48 to 52-hour or 72-hour intestinal trichinae. Some intestinal worms were also recovered but no correlation could be made between intestinal and muscle infections. It is suggested that 72-hour intestinal females may have deposited larvae without becoming established in the intestinal mucosa of the receptor mice.

K. R. Heath

1963—KRASNOLOBOVA, T. A., 1958. [Gelmintologicheskaya laboratoriya AN SSSR.] [The biology of *Prosthogonimus pellucidus* (Linstow, 1873)—causing prosthogonimiasis in domestic birds.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 173–175. [In Russian.]

Prosthogonimus pellucidus eggs containing miracidia did not hatch when kept in water for a month. It is supposed that they must do so within the molluscan host. Experimental infections of the dragon-flies *Cordulia aenea*, *Libellula quadrimaculata* and *Leucorrhinia rubicunda* with xiphidiocercariae from *Bithynia tentaculata* produced infective metacercariae on the 65th to 70th days. Encysted and free metacercariae were found in naturally infected dragon-flies of these species as well as in *Somatochlora metallica*. Some of the encysted larvae had two membranes (infective) and others one membrane (non-infective). The free metacercariae were not numerous and were much larger than the others. Experimental infections with the infective metacercariae produced adults in the Bursa Fabricii of a chick on the 15th day. The adult stage was reached in the oviduct of a chicken in eight days, in the Bursa Fabricii of a gosling in 26 days and in that of a duckling in 42 days. Ten rooks and ten crows all revealed the presence of *P. pellucidus* at autopsy. As treatment Krasnolobova mentions 2 ml. to 5 ml. of carbon tetrachloride for lightly infected hens and 5 ml. twice at fortnightly intervals for those heavily infected.

N. Jones

1964—LOGACHEV, E. D. & BRUSKIN, B. R., 1959. [Kemerovski gosudarstvenni meditsinski institut, U.S.S.R.] [The tissue relationships in the parasite-host system in the ontogenesis of *Opisthorchis felineus*.] **Doklady Akademii Nauk SSSR**, **126** (2), 454–455. [In Russian.]

The authors describe in detail the larval development of *Opisthorchis felineus* in *Bithynia leachi* and the cell reactions of the host to the infection.

G. I. Pozniak

1965—McCULLOUGH, F. S., 1957. [Department of Zoology, Queen's University of Belfast, Northern Ireland.] "A preliminary note on the degree of compatibility between *Schistosoma haematobium* and its bulinid vectors." **West African Medical Journal**, **6** (3), 98–100.

McCullough isolated two strains of *Schistosoma haematobium* in Ghana, one of which readily infected *Bulinus* (*Bulinus*) *truncatus rohlfsi* but which was virtually incapable of developing in *B. (Physopsis) globosus*, the behaviour of other strain being vice versa. Other workers' results on incompatibility between *S. haematobium* and its bulinid vectors in other countries are then discussed.

J. W. Smith

- 1966—NAIR, S., RAMACHANDRAN, C. P., TABOADA, O. & EDESON, J. F. B., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] "The development of *Brugia pahangi* in strains of *Aedes aegypti*." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **55** (1), 3-4.
- 1967—RAMACHANDRAN, C. P., EDESON, J. F. B. & KERSHAW, W. E., 1960. [Department of Parasitology & Entomology, Liverpool School of Tropical Medicine, Liverpool, U.K.] "*Aedes aegypti* as an experimental vector of *Brugia malayi*." **Annals of Tropical Medicine and Parasitology**, **54** (3), 371-375.
- Ramachandran *et al.* describe the development of semi-periodic and periodic forms of *Brugia malayi* in three different strains of *Aedes aegypti*. One cat (experimentally infected in Malaya) provided a source of the semi-periodic form, and another cat the periodic form of *B. malayi*. Mosquitoes were dissected on the 10th day after feeding on the cats. Tabulated results show that the strain of *Aedes* obtained from Malaya less effectively supported the development of both semi-periodic and periodic forms of the parasite than did the other two strains of *Aedes* cultured in Liverpool and London respectively. The behaviour of the two forms of parasite was the same in each strain of mosquito. Infective larvae from the Liverpool strain successfully infected three previously uninfected cats. It is not known whether *A. aegypti* acts as a natural vector of *B. malayi*. The authors suggest that a suitable (yet to be bred) strain of *A. aegypti* could be more useful as a laboratory vector of *B. malayi* than the more usually employed *Mansonia* species. J. W. Smith
- 1968—RAMACHANDRAN, C. P., EDESON, J. F. B. & KERSHAW, W. E., 1960. "The development of *Brugia malayi* in *Aedes aegypti*." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **54** (4), 290-291.
- [A full account of this work appears in **Ann. trop. Med. Parasit.**, **54**, 371-375. For abstract see No. 1967 above.]
- 1969—RAMACHANDRAN, C. P., JIMENEZ, F. & EDESON, J. F. B., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] "Early stages in the development of *Brugia malayi* in different species of mosquitoes." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **55** (1), 2.
- 1970—ROMANIKO, V. I., 1958. [Chelyabinski pedagogicheski institut, U.S.S.R.] [The biology of *Pratylenchus pratensis* in leguminous plants in the Chelyabinsk region.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 293-296. [In Russian.]
- Romaniko gives a detail description of embryonic and post-embryonic development of *Pratylenchus pratensis* in peas. At an average soil temperature of 19°C. to 22°C. during July and August in the Chelyabinsk region the life-cycle is completed in 30 days. In the beginning of December larvae and adults become free in the soil, where the former are said to be more capable of surviving than the latter. N. Jones
- 1971—TANAKA, M., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on *Trichobilharzia physellae* in Oki Islands. 3. Experimental infection of domestic ducks (*Anas platyrhynchos domestica*) with a schistosome cercaria parasitic in fresh-water snails *Lymnaea japonica*.] **Japanese Journal of Parasitology**, **9** (5), 610-614. [In Japanese: English summary p. 614.]
- Domestic ducks, *Anas platyrhynchos domestica* were experimentally infected with Cercaria A from *Lymnaea japonica* in Oki Islands. Tanaka identified the adult flukes obtained from the ducks with *Trichobilharzia physellae*. Y. Yamao
- 1972—TANAKA, M., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on *Trichobilharzia physellae* in Oki Islands. 4. Experimental infection of the snail, *Lymnaea japonica* with the miracidia of *Trichobilharzia physellae*.] **Japanese Journal of Parasitology**, **9** (5), 615-619. [In Japanese: English summary p. 619.]
- The cercariae obtained from *Lymnaea japonica* experimentally infected with the miracidia from eggs of *Trichobilharzia physellae* were identified with Cercaria A from *L. japonica* in Oki Islands. Y. Yamao

1973—TAYLOR, A. E. R., 1960. [National Institute for Medical Research, Mill Hill, London, England.] "The development of *Dirofilaria immitis* in the mosquito *Aedes aegypti*." *Journal of Helminthology*, 34 (1/2), 27-38.

Taylor studied, in living and fixed preparations, the development of *Dirofilaria immitis* in *Aedes aegypti* at 26°C. At this temperature and at 80% relative humidity, the microfilariae developed into infective larvae in 15 to 17 days. It was also found that microfilariae remained in the stomach of the mosquito for the first 24 hours; during the next 24 hours they migrated into the Malpighian tubules. They remained in the cells of the tubules for six to seven days, and from the 9th to 15th day they were found in the lumen of the tubules. By this time they started migrating into the head. The author describes and illustrates in detail the developmental stages of the parasite.

N. Jones

1974—TRANTAPHYLLOU, A. C., 1960. [Department of Plant Pathology, N.C. State College, Raleigh, North Carolina, U.S.A.] "Sex determination in *Meloidogyne incognita* Chitwood 1949 and intersexuality in *M. javanica* (Treub, 1885) Chitwood, 1949." *Annales de l'Institut Phytopathologique Benaki*. New series, 3 (1), 12-31.

By examining tomato roots at intervals of five to ten days after inoculation with larvae of *Meloidogyne incognita* it was shown that larvae which invaded singly nearly all developed into females, but when large numbers developed together most or all became males. When infested roots were incubated at 19°C. for 40 days many males developed as compared with a similar portion of root from the same plant fixed at the time incubation started. In incubated roots all second-stage male larvae developed into males with one testis and many second-stage female larvae developed into males with two testes. Anatomical studies supported other evidence of sex reversal in female larvae. The size of males was found to depend on the length of the feeding period in the host root. In *M. javanica*, if feeding was cut short by death of the host plant, true males were abundant and usually had one testis. Male intersexes were derived from second-stage female larvae by sex reversal and usually had two testes. M. T. Franklin

1975—TRANTAPHYLLOU, A. C. & HIRSCHMANN, H., 1960. [Department of Plant Pathology, N.C. State College, Raleigh, North Carolina, U.S.A.] "Post infection development of *Meloidogyne incognita* Chitwood 1949 (Nematoda—Heteroderidae)." *Annales de l'Institut Phytopathologique Benaki*. New series, 3 (1), 1-11.

This is a detailed account of work described briefly earlier [for abstract see Helm. Abs., 29, No. 2145]. Second-stage infective larvae of *Meloidogyne incognita* undergo their second moult 11 to 13 days after entry into tomato roots at 29°C. Sex can be determined in late second-stage parasitic larvae by the shape of the genital primordium and by the presence of rectal glands in the female and not in the male. Third-stage larvae have no stylet and the posterior end of the body is rounded and without a tail spike. This stage lasts but a few hours and during this time the valve of the oesophageal bulb disappears. After the third moult the valve is reformed, the excretory pore opens near the level of the posterior part of the bulb and the gonads develop with differentiation of vagina and vas deferens. The male becomes elongate and cylindrical and the rectal glands enlarge in the female. The fourth moult is followed by the reappearance of the stylet and in the female the excretory pore opens at the level of the stylet shaft, the oesophageal duct becomes distinct, the valve of the oesophageal bulb enlarges and the female begins to feed. At 29°C. in tomato the first egg-laying females were observed 19 to 21 days after penetration, but the rate of development was variable and in crowded conditions it was much delayed.

M. T. Franklin

1976—USPENSKAYA, A. V., 1960. "Parasitofaune des crustacés benthiques de la mer de Barents. (Exposé préliminaire)." *Annales de Parasitologie Humaine et Comparée*, 35 (3), 221-242.

Uspenskaya gives a preliminary report of investigations of the parasitic fauna of benthic crustaceans in the eastern part of the Barents Sea, carried out during 1949-54. 33,815 dissections, involving 31 species, were made and ten trematode, six cestode, six nematode, two acanthocephalan and one leech species were recorded. The life-cycles of the following species have been definitely established: *Podocotyle atomon*, *Spelotrema excellens*, *Hymenolepis*

microsoma, *Lateriporus teres*, *Terranova decipiens*, *Contracaecum aduncum*, *Ascarophis morrhuae*, *A. filiformis*, *Profilicollis botulus* and *Polymorphus phippsi*. A hymenolepidid cysticercus morphologically resembling that of *Hymenolepis setigera* was found in *Gammarus locusta* and *Anonyx nugax*. The life-cycles of *Podocotyle reflexa*, *Steganoderma messjatzevi*, *Genarches muelleri* and *Spelotrema arenaria* were partly established by finding their metacercariae. The metacercariae of *Derogenes varicus* were recorded in a new host, *Pagurus pubescens*. *Mari-trema gratiosum* and *Levinsoniella propinqua* metacercariae were also found in a number of crustaceans. Larvae of *Eustoma rotundatum* were found for the first time in crustaceans. The paper is supplemented with numerous line drawings and diagrams of life-cycles. N. Jones

1977—VOLGAR, L. G., 1959. [The adaptability of the nematode *Thelandros tba* Dinnik, 1930 to the peculiarities of its host's life-cycle.] **Dokladi Akademii Nauk SSSR**, 124 (6), 1375–1376. [In Russian.]

Volgar describes, for the first time, the males of *Thelandros tba* which he found on examination of 416 tadpoles from the Danube. The female material included worms which contained both eggs and larvae. The eggs in the uterus were observed to develop in two ways: (i) some formed the normal three membranes, two of which were thick, giving a triangular appearance to the egg from an end-on view; and (ii) others, retaining their oval shape and the first thin membrane only, grew and developed into larvae. Volgar considers this to be an adaptation to the short life of the host. G. I. Pozniak

1978—WILLIAMS, R. W., 1960. [School of Public Health & Administrative Medicine, Columbia University, New York City, N.Y., U.S.A.] "Observations on the life history of *Rhabdias sphaerocephala* Goodey, 1924 from *Bufo marinus* L., in the Bermuda Islands." **Journal of Helminthology**, 34 (1/2), 93–98.

Of 40 *Bufo marinus* dissected in the Bermudas in 1957, 33 had *Rhabdias sphaerocephala* in the lungs. The maximum number recovered from one toad was 50, the average number present being ten. Most of the eggs passed by these worms hatched in fresh faeces on the ground. Both direct and indirect development occurred, filariform larvae appearing within 24 hours after direct development; free-living adults appeared later but males were very few in number and/or lived only a very short time, only one being recovered. Following experimental infections involving three small toads (*Bufo*) and one *Eleuthrodactylis johnstoni*, it has been concluded that (i) most filariform larvae shed the rhabditiform skin before contacting their new host; others lose the skin at the time of contact; (ii) it is possible that larvae reach the lungs either through the blood stream or by direct migration. N. Jones

Bionomics

1979—BUKHOVETS, V. I., 1958. [Vinnitski meditsinski institut, U.S.S.R.] [Survival of eggs of *Ascaris lumbricoides* and *Trichuris trichiura* in the climatic conditions of forest-steppe of the Ukraine.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday**. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 89–92. [In Russian.]

Under the conditions in the Ukrainian forest-steppe during 1948–51 various factors which influenced the survival and development of the eggs of *Ascaris lumbricoides* and *Trichuris trichiura* were studied. Soil humidity appeared to have greater influence than air humidity. As a considerable proportion of the eggs survived the winter it is inferred that people there can acquire ascariasis throughout the year. N. Jones

1980—CHOWDHURY, A. B., RAY, H. N. & BHADURI, N. V., 1958. "Intracytoplasmic inclusions in the intestinal epithelial cells of *Ascaris lumbricoides* and their probable significance." **Bulletin of the Calcutta School of Tropical Medicine**, 6 (1), 7–8.

The authors have demonstrated that the inclusion granules in the cytoplasm of the epithelial walls of the intestine of *Ascaris lumbricoides* are conspicuously pyroninophilic, indicating the presence of RNA. They contain no DNA. There is also a selective concentration of a hyaluronic acid type of polysaccharide in these granules and a localization of alkaline phosphatase. These observations support the view that there is intracellular digestion at these sites. S. Willmott

- 1981—DOBY, J. M. & BERNARD, C., 1960. "Galvanotaxie chez la larve de *Strongyloides stercoralis* Bavay, 1876." *Annales de Parasitologie Humaine et Comparée*, **35** (3), 432-434.
Doby & Bernard have studied galvanotaxis in *Strongyloides stercoralis* larvae by means of a specially constructed cell. In three experiments 22, 40 and 28 larvae were placed in the centre of the cell and subjected to a current of 2.5 milli-amperes at 20 volts. 16, 34 and 27 larvae were found respectively in the cathode compartment nine, eight and four minutes later. N. Jones
- 1982—FELDMESSER, J. ET AL., 1960. "Movement of *Radopholus similis* into rough lemon feeder roots and in soil, and its relation to *Fusarium* in the roots." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] *Phytopathology*, **50** (9), 635.
- 1983—FERRIS, J. M., 1960. "Effect of storage temperatures on survival of plant-parasitic nematodes in soil." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] *Phytopathology*, **50** (9), 635.
- 1984—GINETSINSKAYA, T. A., 1960. [Leningradski gosudarstvenni universitet imeni A. A. Zhdanova, U.S.S.R.] [Glycogen in cercariae, and the dependence of its distribution on the specific characters of the parasite.] *Dokladi Akademii Nauk SSSR*, **135** (4), 1012-1015. [In Russian.]
Histochemical studies carried out on ten species of cercariae revealed the presence of glycogen in the body and in the tail. In the tail it was primarily concentrated in special cells and in the "caudal bodies" in furcocercariae. The quantity and distribution of glycogen was found to be in direct relation to the mobility and duration of life of the larvae. The rate at which glycogen was used was in direct relation to the temperature; it was also used more rapidly in the caudal bodies than in the body itself. The movements of free-living cercariae are assured primarily by glycogen in the body. N. Jones
- 1985—GOIL, M. M., 1959. [Bareilly College, Bareilly, U.P., India.] "Haemoglobin in trematodes—*Gastrothylax crumenifer*." *Zeitschrift für Parasitenkunde*, **19** (4), 362-363.
When specimens of *Gastrothylax crumenifer* were ground up in 5 c.c. of saline solution and centrifuged, the supernatant fluid, examined spectroscopically, showed the typical bands of oxyhaemoglobin. It seems probable that the haemoglobin may serve as an oxygen reserve as the parasite lives in the reticulum where the oxygen tension is low. R. T. Leiper
- 1986—HARPUR, R. P. & WATERS, W. R., 1960. [Institute of Parasitology, McGill University, Macdonald College, Quebec, Canada.] "Production of carbon dioxide and volatile acids by muscle from *Ascaris lumbricoides*." *Canadian Journal of Biochemistry and Physiology*, **38** (9), 1009-1020.
Harpur & Waters found that carbon dioxide production by chopped muscle of *Ascaris lumbricoides* was increased when added carbon dioxide was present in the gas phase. The effect was enhanced at high pH. The production of C₆, C₅, C₄, C₃ and C₂ volatile acids in carbon dioxide-free air was compared with production in a gas phase of 7% carbon dioxide in nitrogen. The most consistent feature was the increase in C₅ and C₄ acid fractions under anaerobic conditions. W. P. Rogers
- 1987—HOLLIS, J. P., 1960. "Mechanism of swarming in *Tylenchorhynchus* species (Nematoda, Tylenchida)." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] *Phytopathology*, **50** (9), 639.
- 1988—ISHIKAWA, M., 1960. [Department of Anatomy, School of Medicine, Nagoya University, Nagoya, Japan.] [Studies on the excretory system of the *Ascaris*.] *Japanese Journal of Parasitology*, **9** (5), 457-463. [In Japanese: English summary p. 463.]
Ishikawa states, from the results of his experimental observations, that *Ascaris lumbricoides* from pigs excreted waste products from various organs, i.e. cuticle, lateral lines, lateral canal, so-called "bushy organ" [die büschelförmigen Organe] and intestine. Y. Yamao

1989—ISHIKAWA, M., 1960. [Department of Anatomy, School of Medicine, Nagoya University, Nagoya, Japan.] [Morphological and physiological studies on 'bushy organ' of *Ascaris*.] **Japanese Journal of Parasitology**, 9 (6), 631–635. [In Japanese: English summary p. 635.]

Ishikawa carried out morphological and physiological studies on the so-called "bushy organ" [die büschelförmigen Organe] of *Ascaris lumbricoides* from pigs. According to his studies, the organ is composed of cyst, which is connected with the lateral canal at both pores, body, branch, minute branch, final branch and final organ, and the function of the organ was not phagocytic but secretive. He also found the body colour was changed to red when the organ was electrically heated. Y. Yamao

1990—IWASAKI, H., 1960. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka, Japan.] [Studies on the miracidium of *Gigantobilharzia sturniae* (Tanabe, 1948). 2. Ecology of the miracidium of *G. sturniae* (Tanabe, 1948).] **Japanese Journal of Parasitology**, 9 (5), 582–588. [In Japanese: English summary p. 588.]

The optimal temperature at which eggs of *Gigantobilharzia sturniae* hatched was 20°C. to 28°C. and the optimal pH was 6.8 to 7.4. The movement of miracidia in water could be observed at temperatures ranging from 8°C. to 37°C. and at pH from 6.8 to 7.4. The miracidium showed positive tropism to the intermediate host, *Polypylis hemisphaerula*. Y. Yamao

1991—JESUS, Z. DE & BAUTISTA, B. A., 1957. [College of Veterinary Medicine, University of the Philippines.] "Viability of swine kidney worm larvae in different types of untreated and salt-treated soil." **Philippine Journal of Animal Industry**, Year 1955, 16 (3/4), 127–139.

Jesus & Bautista describe experiments and field trials in a study of the viability of *Stephanurus dentatus* larvae in different types of treated and untreated loam soil and sand in the Philippines. Viability ranged from 61 to 151 days in soil polluted with faeces and urine of pigs and varied little with the different soils. Muddy soil was not so favourable for larval survival as moist to wet soil. High manure pollution and oxygen supply favoured survival. In manure-polluted sand, kept moist, the larvae concentrate near the surface; this disproves the widely held belief that a thick layer of sand frequently sprinkled with water reduces the number of larvae near the surface. When polluted soils are treated with crystals of salt produced by evaporation of sea water at the rate of 0.1 gm. per square centimetre, viability of larvae is reduced to 4 to 15 days. The use of salt crystals on wet soils is preferable to solutions. W. M. Fitzsimmons

1992—KEELING, J. E. D., 1960. [Wellcome Laboratories of Tropical Medicine, Euston Road, London, N.W.1.] "The effects of ultra-violet radiation on *Nippostrongylus muris*. I. Irradiation of infective larvae: lethal and sublethal effects." **Annals of Tropical Medicine and Parasitology**, 54 (2), 182–191.

Infective larvae of *Nippostrongylus muris* were exposed to radiations from a cold cathode mercury vapour resonance lamp with an output of 15 microwatts per cm., emitting over 80% of its ultra-violet radiation in the region of 2,537 Å. An exposure of four minutes at a distance of 0.5 cm. was sufficient to immobilize all larvae irreversibly. Larvae which had received smaller doses and appeared normal were incapable of reaching maturity after inoculation into young rats. When an aqueous suspension of larvae 4 mm. deep was exposed at a distance of 8 cm. for 32 seconds the larvae did not complete their development in the rat. At a distance of 8 cm. with the larvae absorbed on to a filter-paper "irradiation mat", exposure for 16 seconds completely inhibited development to the adult stage. It was concluded that the suspending medium protected the larvae from the full effects of irradiation. It is possible that the wave length is effective through its action on nuclear components required for replication of chromosomal structures during growth or the action might cause local damage to vital organs or tissues or cause destruction of neurosecretory systems responsible for exsheathment of larvae at the third moult and prevent passage to the lungs. A more general reaction by the cells in the parasite body might result in a reduction of efficiency during migration, which would enable the host tissue reactions to destroy the parasite. K. R. Heath

1993—MYUGE, S. G., 1958. [Gelmintologicheskaya laboratoriya AN SSSR.] [The physiological characters of predacious Diplogasteridae.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 250–252. [In Russian.]

In *Diplogaster lheritieri* the enzymes (cathepsin, glycogenase) of the digestive glands are similar to the exoenzymes of the muscle cells but more concentrated. N. Jones

1994—NADAKAL, A. M., 1960. [Department of Biology, University of Southern California, Los Angeles, California, U.S.A.] "Chemical nature of cercarial eye-spot and other tissue pigments." **Journal of Parasitology**, **46** (4), 475–483.

Nadakal showed, by means of histochemical tests, that the eye-spots and pigmented body tissues of several species of cercariae contained melanin. Tests for tyrosinase were inconclusive, and tests for copper and iron gave negative results. However tyrosine was present and the amounts found in pigmented species were greater than in unpigmented species. W. P. Rogers

1995—NOLTE, H. W., 1958. [Biologische Zentralanstalt der Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin, Institut für Phytopathologie, Aschersleben, Ermslebener Strasse 52, Germany.] "Die Aktivierung der Larven Zystenbildender Nematoden." **Sitzungsberichte. Deutsche Akademie der Landwirtschaftswissenschaften zu Berlin**, **7** (10), 27 pp. [English & Russian summaries pp. 22–23.]

This is a review of some of the work on hatching and emergence of cyst-forming nematodes in the genus *Heterodera*, with a bibliography of 82 references. A. M. Shepherd

1996—PIECZYŃSKA, E., 1960. [Zakład Ekologii Zwierząt, Uniw. Warszawski, Poland.] "Preliminary studies on the effect of environmental changes on nematode fauna in the periphyton." **Bulletin de l'Académie Polonaise des Sciences. Classe II. Série des Sciences Biologiques**, **8** (1), 19–22.

Pieczynska examined the nematode fauna of the periphyton of reeds on two littoral sites in Lake Wilkus in Poland. The two faunas were remarkably stable, being typical of periphyton habitats—many individuals but few species with one distinctly dominant. Ten species are listed, *Prochromadorella bioculata* and *Punctodora ratzeburgensis* together forming over 90% of the total nematodes. The former dominated at site A (79% to 92%), the latter less completely (61% to 79%) at site B. In samples of reeds transferred from B to A, *Prochromadorella bioculata* soon became dominant and a similar, but less complete, tendency towards reversal of dominance occurred in samples transferred from A to B. The author concludes that the prevalence pattern of periphyton nematodes is governed by the environment, numerical changes in the nematodes of transferred samples being probably due to an altered rate of reproduction in the new site. R. D. Winslow

1997—ROSS, J. P., 1960. "The effect of soil temperatures on development of *Heterodera glycines* in soybeans." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, **50** (9), 652.

1998—SEMENOV, V. D. & VINOKUROVA, M. P., 1958. [Gorkovski meditsinski institut, U.S.S.R.] [The distribution of the enzyme carbonic anhydrase in helminths.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 331–336. [In Russian.]

Semenov & Vinokurova studied the presence and distribution of carbonic anhydrase in three trematode, seven cestode and three nematode species. The activity of this enzyme varied with the species. In cestodes it increased with the ontogenetic development. This enzyme was found in the cyst fluid of larval cestodes. In ascarids it was much more active in the body fluid than in the tissues but activity was very high in the reproductive system. N. Jones

- 1999—SHIKHOBALOVA, N. P., VASILKOVA, Z. G., SHEKHTMAN, Y. L. & VINOGRADOVA, I. D., 1958. [Gelmintologicheskaya laboratoriya, Akademiya nauk SSSR.] [Change in the irradiation sensitivity of eggs of some Ascaridata in relation to the stage of embryogenesis.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 400–406. [In Russian.]

Shikhobalova *et al.* irradiated with roentgen and gamma rays of Cobalt 60 the eggs of *Ascaris lumbricoides*, *A. suum* and *Ascaridia galli* at various stages of development, ranging from one blastomere to that of infective larva. The eggs were most sensitive at the blastula, morula and early gastrula stages, as judged by the number of infective larvae and their ability (which was reduced) to migrate within the host. This ability was more affected when *Ascaris suum* and *A. lumbricoides* eggs were irradiated at the one blastomere stage than after embryogenesis was completed. Post-embryonic development was affected by irradiation and as a result the percentage of females was increased. N. Jones

- 2000—STOLZY, L. H., VAN GUNDY, S. D. & LETEY, Jr., J., 1960. "Oxygen tolerances of four plant-parasitic nematodes." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 656.

- 2001—STONE, L. E. W., 1960. "Field experiments on cereal root eelworm." **Annals of Applied Biology**, 48 (4), 681–686.

Populations of *Heterodera major* fell to less than 5% of their original level in three years under three common types of ley. Of six pure grass stands tested, populations fell most sharply under cocksfoot and tall fescue. Host efficiency in terms of numbers of eggs per gm. soil was assessed for four cereals. In order of decreasing efficiency they were oats, barley, wheat and rye. H. R. Wallace

- 2002—TARJAN, A. C., 1960. "Longevity of the burrowing nematode, *Radopholus similis*, in host-free soil." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 656–657.

- 2003—TAYLOR, A. & WHITLOCK, J. H., 1960. [New York State Veterinary College, Ithaca, New York, U.S.A.] "The exsheathing stimulus for infective larvae of *Haemonchus contortus*." **Cornell Veterinarian**, 50 (3), 339–344.

The writers report that they were able to stimulate exsheathment of third-stage *Haemonchus contortus* larvae by placing them in various dilute saline solutions saturated with carbon dioxide in a shaking machine in an incubator at 37°C. Acids other than carbonic acid, if used above the lethal pH for larvae (pH3) were also found to be able to cause ecdysis; however, results were more variable. Experiments also demonstrated that all salts were not equally effective. There was a marked tendency for the oxy-acid buffer salts to be effective at much lower concentrations than sodium chloride; this is thought to be due to their ability to catalyze the $H_2O + CO_2 \leftrightarrow H_2CO_3$ reaction. The authors were not able to confirm the view held by some that active reduction *per se* was a necessary component of the exsheathment stimulus. Solutions used, at various concentrations, were sodium chloride, potassium dihydrophosphate, calcium chloride, magnesium sulphate, glucose, lactose, phosphate buffer, sodium sulphite, potassium hydrogen phosphate, sodium bicarbonate, NaH_2BO_3 and sodium selenite.

W. M. Fitzsimmons

- 2004—THOMASON, I. J., 1960. "The effect of winter cereals on the population level of *Meloidogyne javanica*." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology**, 50 (9), 657.

- 2005—WERTHEIM, G., ZELEDON, R. & READ, C. P., 1960. [Hadassah Medical School, Hebrew University, Jerusalem, Israel.] "Transaminases of tapeworms." **Journal of Parasitology**, 46 (4), 497–499.

Wertheim *et al.* tested a number of substrates as donors of amino groups to α -ketoglutaric acid and pyruvic acid in transaminase systems in three species of cestodes. Very few amino compounds were effective donors. *Hymenolepis citelli* and *H. diminuta* used alanine as an

amino donor with α -ketoglutaric acid, whereas *H. nana* apparently would not; and *H. diminuta* could use amino groups from aspartic acid and asparagine for the amination of pyruvic acid but *H. citelli* could not. Some evidence was obtained to show that the species of the host influenced the nature of the transaminase system present in the parasite. W. P. Rogers

2006—YUTUC, L. M., 1958. [College of Veterinary Medicine, University of the Philippines, Quezon City, Luzon.] "On the artificial hatching of *Trichuris vulpis* embryonated eggs with a note on abnormal ova and posture of the embryos." **Philippine Journal of Science**, Year 1957, **86** (3), 275–279.

The procedure used by Yutuc for observing the hatching of embryonated eggs of *Trichuris vulpis* in vitro was that described by him in a previous paper [for abstract see Helm. Abs., **24**, No. 578cx]. Eggs embryonated in sterile distilled water and later transferred to bile-Locke's solution (contaminated mainly by fungi) showed the highest percentage of hatching. The percentage hatching was higher in pure distilled water than in distilled water with formalin, added to kill fungi and ciliates. Over- and under-sized, as well as malformed eggs are described and figured. The hatching postures described and figured here are essentially the same as those given in an earlier paper by Yutuc [for abstract see Helm. Abs., **25**, No. 105ch]. J. W. Smith

Pathogenesis

2007—CAMPBELL, J. A., 1960. [Animal Disease Research Association, Moredun Institute, Gilmerton, Edinburgh 9, Scotland.] "Anaemia in trichostrongylid infestations." [Correspondence.] **Veterinary Record**, **72** (50), 1170–1171.

Campbell replies to Pattison's criticism of his paper on anaemia in trichostrongylid infections. [For abstracts see Helm. Abs., **30**, No. 1178 & No. 2012 below.] S. Willmott

2008—JARRETT, W. F. H. ET AL., 1960. [University of Glasgow Veterinary School, Glasgow, Scotland.] "Symposium on husk. 1. The disease process." **Veterinary Record**, **72** (48), 1066–1068. [Discussion pp. 1086–1090.]

An infection with *Dictyocaulus viviparus* can be divided into four phases, these are the penetration, prepatent, patent and postpatent phases. Clinical symptoms seen at each phase are described; during the penetration phase there are few or none. In the prepatent phase there is a marked increase in respiratory rate; at this stage primary lesions and blockage of the small bronchi by eosinophil exudate occurs; this starts to regress towards the end of the third week in a moderate infection but in a very heavy infection death may occur at the third week. At the patent phase adults and eggs are present in the bronchi and consolidation of the lung lobules are now found with respiratory rates of 100 per minute. In the final postpatent phase the animals recover. The complications which may occur during the disease are pulmonary oedema, emphysema and secondary bacterial infections, and as a sequel to the infection bronchiectasis and pulmonary fibrosis. K. R. Heath

2009—JUBB, K. V., 1960. [Ontario Veterinary College, Guelph, Ontario, Canada.] "The lesions caused by *Filaroides milksi* in a dog." **Cornell Veterinarian**, **50** (3), 319–325.

Lesions caused by *Filaroides milksi* in a ten-year-old Boston terrier are described in detail. Macroscopically there were no pleural adhesions on the lungs but the pulmonary pleura was thickened. Incision showed greyish, firm, airless masses containing small hard white foci. Histologically the lesions were due to diffuse granulomatous reaction, mechanical disruption by numerous parasites and to emphysema. Viable larvae only were found embedded in more or less discrete granulomata; mature parasites within the parenchyma provoked scant reaction. Larvae contained within granulomata were also present in the brain, liver, pancreas, ovary, gastric and intestinal mucosa, and thyroid. Spread of microfilariae from the lungs was haematogenous. W. M. Fitzsimmons

- 2010—KASSAI, T., 1957. "Vizsgálatok a juhok gócos tüdőférgességéről. II. A juh-*protostrongylos* dosisok elkülönítő körjelzése kórbonctani elváltozások alapján." *Magyar Allatorvosok Lapja*, 12 (3), 69–73. [English & Russian summaries p. 73.]

Pathological changes in the lungs of sheep affected by *Cystocaulus ocreatus*, *Protostrongylus* spp. and *Muellerius capillaris* are described. I. Szladits

- 2011—MÜNNICH, H., 1958. [Zoologisches Institut der Humboldt-Universität, Berlin N4, Invalidenstr. 43, Germany.] "Histochemische Untersuchungen über die Wirkung von *Ascaris*-Larven auf die Leber der Maus." *Naturwissenschaften*. Berlin, 45 (22), 551–552.

Münnich has studied the histochemical changes produced by *Ascaris lumbricoides* larvae in the liver of white mice two and four days after experimental infection. In foci, formed by the migrating larvae and characterized by leucocytic infiltration and haemorrhage, the content of glycogen and RNA was totally and that of fat considerably reduced, occasional foci however contained still intensely fatty cells. The glycoprotein content rose with the age of the foci and can be referred to the proliferation of the connective tissue. The intensity of protein reactions remained unchanged and alkali phosphates occurred only in small amounts in occasional foci. The liver tissue outside the foci was histochemically unchanged. G. I. Pozniak

- 2012—PATTISON, I. H., 1960. [42, Wendan Road, Newbury, Berks, U.K.] "Anaemia in trichostrongylid infestations." [Correspondence.] *Veterinary Record*, 72 (48), 1099–1100.

Pattison criticizes the paper by Campbell & Gardiner on anaemia in trichostrongylid infections [for abstract see Helm. Abs., 30, No. 1178]. S. Willmott

- 2013—RODGER, F. C., 1957. "The pathogenesis of ocular onchocerciasis." *Transactions of the Ophthalmological Society of the United Kingdom*, 77, 267–284. [Discussion pp. 284–289.]

In addition to the obvious histological changes in the skin which are associated with the presence of *Onchocerca volvulus* microfilariae, the dermal blood vessels are also consistently involved as a result of the death of the microfilariae. The pathogenesis of the inflammatory reactions in all the eye tissues, which several authors have reported, has not yet been definitely elucidated. The injection of living microfilariae into the aqueous humour of rabbits had no effect but an almost immediate inflammatory reaction was induced when dead microfilariae were used. Pathological studies on 20 human eyeballs confirmed the presence of microfilariae in all the ocular tissues and, for the first time, in the retina. It is suggested that posterior degenerative lesions of the eye in onchocerciasis may be due to a coincident vitamin A deficiency. In the discussion Woodruff thought it possible that dust-borne disease might also be a contributing factor. R. T. Leiper

- 2014—SYMONS, L. E. A., 1960. [Division of Animal Health, C.S.I.R.O., McMaster Laboratory, Glebe, N.S.W., Australia.] "Pathology of infestation of the rat with *Nippostrongylus muris* (Yokogawa). V. Protein digestion." *Australian Journal of Biological Sciences*, 13 (4), 578–583.

Egg albumin, labelled with radio-iodine, was intubated into the stomach of rats on the tenth day after infection with *Nippostrongylus muris* and of nine control rats. One hour after the feeding 68.9% of the meal was recovered from the stomach and small intestine of eight infected rats and 50% from the controls. This was mainly due to the depression of digestion in the small intestine, although absorption from the small intestine was also slightly less in the infected animals, i.e. 80.3% as compared with 89% in the controls. The infection did not affect gastric digestion or gastric evacuation. N. Jones

- 2015—TASKER, P. W. G., 1961. [Institute for Medical Research, Kuala Lumpur, Malaya.] "Blood loss from hookworm infection." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (1), 36–39.

The daily intestinal loss of blood in 20 patients with *Necator americanus* infections, as determined by the Cr¹⁵ red cell labelling method varied from about 2 ml. with about 100 worms to 90 ml. with over 1,500 worms. It was proportional to the worm burden not to the haemoglobin level. R. T. Leiper

Epidemiology

2016—BAILENGER, J., 1957. [Faculté de Médecine et de Pharmacie de Bordeaux, France.] "État actuel de l'épidémiologie de l'échinococcose dans le Sud-Ouest de la France." *Revue d'Hygiène et de Médecine Sociale*, **5** (8), 707-740.

2017—FENG, L. C. & MA, S. F., 1957. [Chinese Union Medical College, Peking, China.] "The transmission of *Wuchereria malayi* in nature by *Anopheles hyrcanus* var. *sinensis*." *Scientia Sinica*, **6** (3), 493-500.

Feng & Ma examined 684 persons and found 264 infected with *Wuchereria malayi*. *Anopheles hyrcanus* var. *sinensis*, breeding in rice fields fed with cool clear water, appears to be the main species responsible for transmitting *W. malayi*. Infection with *W. bancrofti* (also transmitted by *A. hyrcanus* var. *sinensis*) occurs chiefly on the plains, whereas infection with *W. malayi* is especially found in hilly regions; the postulated existence of at least two different races of vector with different habitats may account for this difference in distribution. J. W. Smith

2018—ISHIZAKI, T., ET AL., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [Epidemiological studies on endemic filariasis due to *Wuchereria bancrofti*. 1. Historical investigation in Kawajiri village, Yoshiwara City, Shizuoka Prefecture.] *Japanese Journal of Parasitology*, **9** (6), 692-700. [In Japanese: English summary pp. 699-700.]

A survey was carried out to ascertain changes in filarial endemicity over a period of time. Kawajiri village, Yoshiwara City, Shizuoka Prefecture, in which filarial infection had been shown to exist about 40 years ago was taken as a sample. The results indicated that the filarial infection had disappeared from this area; this is attributed in part to geographical changes in the area, namely, the natural and artificial filling-up of the neighbouring swamps. The intensive application of new effective insecticides to the fields must also have caused a decrease in the mosquito population in the area. Y. Yamao

2019—IZYUMOVA, N. A., 1958. [Institut biologii vodokhranilishch AN SSSR.] [Parasitic infections of fish, pathogenic to man, in areas around water reservoirs.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 139-142. [In Russian.]

Izyumova, after referring to her own work (1956) and that of Stolyarov (1954), Shigin (1958), Barisheva (1958) and Kosheva (1954), discusses the development of the parasitic fauna, particularly *Diphyllbothrium latum* and *Opisthorchis felineus* in connection with the creation of artificial water reservoirs. She explains the difference in their incidence in fish before and after the establishment of such reservoirs by the unequal distribution of the first and second intermediate hosts while more land is being flooded. As such reservoirs would tend to increase the possibility of human infection, systematic therapeutic and prophylactic measures should be carried out in these areas. N. Jones

2020—KASSAI, T., 1958. "Vizsgálatok a juhok gócos tüdőférgességéről. VII. (befejező) rész. A juhok gócos tüdőférgességének járványtana." *Magyar Állatorvosok Lapja*, **13** (5), 125-127.

A summary is given of the process of infestation of pastures and of snails as intermediate hosts, and the acquisition of Protostrongylidae by grazing sheep, together with a brief description of the course of disease in the affected animal. I. Szladits

2021—REIN, K., 1957. [Vik i Sogn, Norway.] "Echinokokk sykdommen i Nord-Norge. Forekomst og bekjempelse." *Nordisk Medicin*, **58** (48), 1853-1857. [English summary p. 1857.]

34 probable cases of hydatid disease in man have been reported in northern Norway since 1951. The dogs, which the Lapps use when tending their reindeer, contract the disease by eating infected reindeer offal. Salt hunger drives the reindeer to eat snow contaminated with the egg-laden faeces of the dogs thus acquiring the infection. The disease in man accompanies the occupation of reindeer breeding. Rein suggests methods of controlling the disease. J. W. Smith

Immunity

- 2022—ANDERSON, R. I., 1960. [Department of Biology, The Catholic University of America, Washington, D.C., U.S.A.] "Serologic diagnosis of *Schistosoma mansoni* infections. I. Development of a cercarial antigen slide flocculation test." **American Journal of Tropical Medicine and Hygiene**, 9 (3), 299-303.

Australorbis glabratus was used as the source of *Schistosoma mansoni* cercariae for these studies. Before extracting the specific antigen in buffered salt solution Anderson removes non-specific antigenic lipids from previously desiccated cercariae by a method essentially that of Chaffee *et al.* 1954 [for abstract see Helm. Abs., 23, No. 207a]. The capacity of the antigen emulsion to react with homologous antibody was greatly increased by removing the antigen-cholesterol-lecithin complex from the salt solution in which it was prepared and resuspending the complex in fresh salt solution. A table shows the results of heating and/or washing on the sensitivity of the antigen emulsion. Flocculation tests on the sera of 435 patients known to have *S. mansoni* showed 91% to be strongly reactive, 7% weakly reactive and 2% non-reactive. The author states that while specificity of the test was excellent in other helminthic diseases, cross reaction of the *S. mansoni* antigen and *Trichinella spiralis* did occur. Anderson considers the test suitable for field and survey purposes.

J. W. Smith

- 2023—GOULSON, H. T., 1958. [Department of Parasitology, University of North Carolina, Chapel Hill, North Carolina, U.S.A.] "Studies on the influence of prior infection with *Ancylostoma caninum* on the establishment and maintenance of *Trichinella spiralis* in mice." **Journal of the Elisha Mitchell Scientific Society**, 74 (1), 14-23.

Goulson found that infection of mice with 800 *Ancylostoma caninum* larvae either given at the same time as or 12 hours before an infection with either 200 or 400 *Trichinella spiralis* larvae did not significantly affect the establishment of this *T. spiralis* infection. However, when intervals of either 24 hours or 48 hours elapsed between these infections there was a significant reduction in the number of *T. spiralis* worms as measured by adult worm counts seven days after infection. With intervals between infections of 96, 144 or 192 hours there was no significant effect on the *T. spiralis* infection. These findings are in disagreement with those of Cox who showed a significant reduction in the *T. spiralis* worm burden of mice by an infection with *A. caninum* given 10 days earlier [for abstract see Helm. Abs., 21, No. 230bf]. The reduction of *T. spiralis* adults occurred by the third day after infection in mice that had received a previous infection of 800 *A. caninum* larvae 24 hours before the infection with 400 *T. spiralis* larvae; the reduction occurred by the fifth day in mice receiving both previous infections of 200 *T. spiralis* larvae 22 days before, and 800 *A. caninum* larvae 24 hours before the infection with 400 *T. spiralis* larvae. Statistical comparison of worm counts from each quarter-section of the small intestine showed this reduction to occur primarily in the anterior portions. A non-specific inflammatory response of the cells resulting from infection with *A. caninum* appears to be responsible for the rapid elimination of adult *T. spiralis* especially from the anterior part of the small intestine.

J. W. Smith

- 2024—JACKSON, G. J., 1960. [Department of Microbiology, The University of Chicago, Chicago 37, Illinois, U.S.A.] "Fluorescent antibody studies of *Nippostrongylus muris* infections." **Journal of Infectious Diseases**, 106, (1), 20-36.

Fluorescent antibody has been produced by the labelling of sera and globulins with greenish fluorescent compounds such as fluorescein isocyanate, di-iodofluorescein isocyanate and 5-dimethyl-amino-1-naphthalene sulphonyl chloride. These compounds have been used for examining the precipitates in the oral, anal and possibly excretory pores of living *Nippostrongylus muris* larvae, together with the male and female genital pores in the adults and the surface of eggs. Specific staining of the digestive tract of infective larvae in section and of adults and the reproductive organs of males and females in section occurred. These results indicate that physiological end products (primarily secretion and excretion of reproductive and digestive systems) of *N. muris* are the common and effective antigen in the host animals.

Fluorescent antibody from rabbit (but not rat) was demonstrated to be specifically bound between old and new cuticles of moulting fourth-stage larvae. No precipitates were formed in larvae freshly hatched in anti-sera nor were these living larvae stained by fluorescent antibody.

K. R. Heath

2025—JEZIORAŃSKA, A. & DOBROWOLSKA, H., 1957. [Zakład Parazytologii Lekarskiej PZH, Warsaw, Poland.] "Odczyny immunologiczne przy chorobach bąblowcowej." **Przegląd Epidemiologiczny**, **Warsaw**, **11** (2), 139–149. [English & Russian summaries pp. 148–149.]

Fresh and dried scoleces and membranes of hydatid cysts from pigs were used in the preparation of antigens in physiological saline as well as lipid, polysaccharide and protein fractions. Hydatid fluid was also used. Complement fixation tests with these antigens, as well as those prepared from *Ascaris lumbricoides*, *A. suum*, *Taenia saginata*, *Trichinella spiralis* and *Cysticercus cellulosae* with serum of immunized rabbits, showed that all of them had common antigenic substances. The highest incidence of positive results was among patients suspected of hydatid of the liver and the lowest among those suspected of hydatid of the lungs. Out of 48 cases of non-helminthic diseases ten non-specific results were obtained with the complement fixation test at 37°C. and 14 at 4°C. These tests gave a somewhat higher incidence of positive results than ring precipitation tests.

N. Jones

2026—KAGAN, I. G., NORMAN, L. & ALLAIN, D. S., 1960. [Department of Health, Education and Welfare, Public Health Service, Communicable Disease Center, Atlanta, Georgia, U.S.A.] "Studies on echinococcosis: serology of crude and fractionated antigens prepared from *Echinococcus granulosus* and *Echinococcus multilocularis*." **American Journal of Tropical Medicine and Hygiene**, **9** (3), 248–261.

Using fluid from hydatid cysts of *Echinococcus granulosus* from pigs in Tennessee and cysts of *E. multilocularis* from experimentally infected cotton-rats, Kagan *et al.* prepared fractions after the techniques employed by Dennis. These fractions were used as test antigens for tannic acid haemagglutination and for bentonite flocculation tests on sera from patients infected with *E. granulosus* and from Eskimos believed to be infected with *E. multilocularis*; in addition, antisera from rabbits previously inoculated with antigenic material from both species of *Echinococcus* was tested. Absolute specificity was not observed in either test with hydatid fluid, scoleces, cyst and membrane antigens. Hydatid fluid with both tests, gave the best results from known human *E. granulosus* infections, and was as reactive as the fractions. Crude hydatid fluid was less satisfactory with the suspected cases of *E. multilocularis* infections, fractionated antigens from the whole cyst being superior.

G. A. Webster

2027—KIM, C. W., 1957. [Department of Microbiology, New York Medical College, Flower and Fifth Avenue Hospitals, New York 29, N.Y., U.S.A.] "Immunity to *Trichinella spiralis* in mice infected with irradiated larvae." **Journal of the Elisha Mitchell Scientific Society**, **73** (2), 308–317.

Kim irradiated *Trichinella spiralis* larvae with certain dosages (1,750 r., 3,500 r., 5,250 r., or 7,000 r.) to eliminate one or more of the following arbitrary phases of the life-cycle: phase I, the pre-adults; phase II, the adults; and phase III, the larvae after their release from the female until encystment in the musculature. These larvae were used in giving three stimulating infections to mice, the degree of immunity produced being measured by adult worm counts and the length of female worms seven days after a challenging infection with non-irradiated larvae, and larval counts 28 days following this infection. The degree of immunity produced was compared with that produced in mice given the same number of stimulating infections with non-irradiated larvae. All groups of mice given the stimulating infections with irradiated larvae showed some acquired immunity. The migrating and encysting larvae (phase III) do not appear to contribute to the total immunity, whereas the adults (phase II) and especially the pre-adults (phase I) are important in producing protective antibodies.

J. W. Smith

- 2028—LEE, C. L. & LEWERT, R. M., 1960. [University of Chicago, Department of Microbiology, Chicago 37, Illinois, U.S.A.] "The distribution of various reactants in human anti-*Schistosoma mansoni* serums fractionated by starch electrophoresis." *Journal of Infectious Diseases*, **106** (1), 69–76.

Lee & Lewert obtained six samples of immune sera from patients infected with *Schistosoma mansoni* and subjected each of them to starch electrophoresis using 50 cm. starch blocks. Tests were then carried out to determine whether any reactants other than anticercarial "collagenase" migrate with α -globulin and whether distinct differences exist in the distribution of those substances responsible for complement fixation, miracidial agglutination, cercarial agglutination and circum-oval precipitation. Each starch block was cut into segments which were then eluted with either phosphate buffer, veronal buffer, saline or water depending on the test to be performed. Results are expressed graphically. As expected, the proteolytic cercarial enzyme inhibitor showed peak activity in eluates from the α -globulin fraction with only slight activity in those from the β -globulin fraction and none in those from the albumin fraction. Complement-fixing antibodies, determined with either alcoholic cercarial or alcoholic adult antigen, were primarily limited to the γ_1 and γ_2 -globulin fractions. Circum-oval precipitins were found in the γ_1 -globulin fraction and showed only limited activity in the β -globulin fraction. Eluates from between the α and β -globulins immobilized live miracidia without precipitation or agglutination, whereas those from between the β and γ fractions showed extensive precipitation and agglutination reactions against live miracidia. Eluates of the albumin fraction immobilized live cercariae; distinct cercarial precipitins and agglutinins were present in the β -globulin and especially in both γ -globulin fractions. Cercarienhüllen (CHR) reactions were not observed for any eluate. All sera having circum-oval precipitins also had miracidial precipitins and agglutinins, miracidial agglutination being the most sensitive test of the series. Substances in the serum which react with miracidia are distinct from those reacting with cercariae on the basis of their distribution within the serum and in their occurrence from individual to individual. Determination of the precise number of antibodies in natural infections with *S. mansoni* must await further studies of serum globulins.

J. W. Smith

- 2029—MIKI, T., 1959. [Department of Pathology, School of Medicine, Tokushima University, Tokushima, Japan.] [Studies on precipitin and rapid flocculation tests for clonorchiasis.] *Shikoku Acta Medica*, **15** (5), 1349–1382. [In Japanese: English summary pp. 1349–1350.]

Miki carried out immunological studies on clonorchiasis in rabbits to ascertain if the tests could be applied for laboratory diagnosis. Five antigens were tested, namely, the supernatant from whole *Clonorchis sinensis* extract in saline, protein and polysaccharide fractions from the extract, "foster fluid" from the adult worm and worm extract antigen heated to 100°C. for one hour. He found that the precipitin and rapid flocculation tests, especially with the saline extract of whole *Clonorchis sinensis*, showed an excellent and specific reaction and that it was possible to a certain extent to establish a criterion of cure.

Y. Yamao

- 2030—NAIMARK, D. H. ET AL., 1960. [Headquarters Fourth Army, Fort Sam Houston, Texas, U.S.A.] "Studies of schistosomiasis in primates: observations on acquired resistance (progress report)." *American Journal of Tropical Medicine and Hygiene*, **9** (4), 430–435.

Naimark *et al.* used 26 *Macaca mulatta* divided into four groups. Group I consisted of seven, Group II of eleven and Group III of six monkeys. Two monkeys formed a lethal-exposure control group. Group I received a single exposure to 1,000 cercariae of *Schistosoma mansoni*; Group II, combinations of moderate (500 cercariae) and light exposures (25 to 50 cercariae); Group III, a series of 26 light exposures (25 to 50 cercariae) given at 35-day intervals. The two monkeys in the lethal-exposure control group died following exposure to 5,000 cercariae. A count was made twice weekly of all eggs recoverable from 2 gm. of faeces. In Group I, the near-maximum egg production (about 500 eggs per examination) persisted for 60 to 90 days but became negligible within 300 days. Group II showed very variable results which is an indication of individual variation in natural and acquired resistance. Group III showed similar egg production patterns, differing as to the number produced. Every monkey in each group

was exposed to a first massive challenge of 5,000 cercariae after about 1,000 days, which resulted in no increase or renewal of egg production. Autopsies of animals were made at intervals of 6, 15, 22, 42, 55 and 65 days after a second massive challenge of 5,000 cercariae 85 to 245 days after the first challenge. No worms were found in the liver six days after the second challenge. At 15 days a few schistosomulae were present. In monkeys examined at 22 to 42 days about 10% of the cercariae used in the challenge exposure had reached the liver. These were undeveloped or stunted. At 55 and 65 days the authors state that stunted worms were present in two animals, but in two others the worms had essentially disappeared. Reference is made to the work of Vogel & Minning, 1953 [for abstract see Helm. Abs., 22, No. 709a].

J. W. Smith

2031—NEMESÉRI, L. & VIZY, L., 1958. "A trichinellosis megállapítása mikroprecipitációs és komplementumkötési próbával." *Magyar Állatorvosok Lapja*, 13 (8/9), 230–232. [English & Russian summaries p. 232.]

When 0.5 ml. blood plasma from affected individuals is added in petri dishes to 100 *Trichinella* larvae obtained from artificially infected guinea-pigs, a vesiculate or cluster-shaped bubbly precipitate appears near the head more rapidly and on a greater number of larvae when the infection is heavy; a precipitate appearing within half-an-hour during incubation at 37°C. indicates a heavy infection. An antigen prepared from *Trichinella* larvae in infected guinea-pigs was used in the complement fixation test; this is less sensitive than microprecipitation but may be used for supplementing the latter.

I. Szladits

2032—PACHECO, G., WYKOFF, D. E. & JUNG, R. C., 1960. [Department of Tropical Medicine and Public Health, Tulane University Medical School, New Orleans, Louisiana, U.S.A.] "Trial of an indirect hemagglutination test for the diagnosis of infections with *Clonorchis sinensis*." *American Journal of Tropical Medicine and Hygiene*, 9 (4), 367–370.

Pacheco *et al.* used Kagan's modification of the Boyden technique of tanned-cell indirect haemagglutination [for abstract see Helm. Abs., 24, No. 293]. A triethanolamine buffered saline extract of lyophilized adult *Clonorchis sinensis* previously ground twice in ether at –18°C. proved more sensitive and specific than a simple phosphate buffered saline extract. The temperature was maintained at or below 5°C. to minimize denaturation. Tabulated results show that cross reactions were found when phosphate buffered saline extract was tested with sera from patients infected with *Paragonimus westermani*, *Schistosoma mansoni* and *S. haematobium* as well as with sera from animals infected with *P. kellicotti* and *S. japonicum*. No cross reactivity was found with sera from patients infected with *Ascaris lumbricoides*, *Trichuris trichiura*, *Necator americanus* or *Strongyloides stercoralis*, or from animals infected with *Toxocara canis*, *A. lumbricoides* or *Heterobilharzia americana*. When the triethanolamine buffered saline extract was tested, no cross reactivity was found with any of the above sera. The authors suggest that final conclusions as to the cross reactivity of these extracts should await further controlled testing of a larger number of sera. The tanned-cell haemagglutination test was found to be more sensitive than a complement fixation test, using the same extract and sera, carried out earlier by Wykoff, 1959 [for abstract see Helm. Abs., 28, No. 36f].

J. W. Smith

2033—POYNTER, D. ET AL., 1960. [Allen and Hanburys Ltd., Ware, Herts, U.K.] "Symposium on husk. 4. Recent experiences with vaccination." *Veterinary Record*, 72 (48), 1078–1086. [Discussion pp. 1086–1090.]

The authors describe the use of the guinea-pig as an experimental animal for *Dictyocaulus viviparus*. They showed that the larvae reached the lungs within 24 hours travelling via the lymph vessels. Larvae irradiated with 40,000 r. reach the lungs at the same rate and in similar numbers as non-irradiated larvae but they are suppressed at about six to eight days. Normal larvae reach the lung of the resistant guinea-pig at the same rate and in similar numbers as they do in susceptible guinea-pigs but are not found after five days. No lymph node hold up

was found. Normal and irradiated larvae produce the same degree of protection. In the calf it was also shown that the larvae reached the lungs where subsequent development occurs and that they do not dwell as fourth-stage larvae in the lymph nodes. Larvae which have been irradiated with 40,000 r. also reach the lungs which are relatively clear 30 days later. It seems that a suppression similar to that seen in the guinea-pig is also found in the calf. Comparison of the number of worms found in lungs of vaccinated calves with those in unvaccinated animals showed an average of one per calf and in the control animals an average of 37.6 worms per calf. Precautions were taken to ensure that the vaccine did not transmit any other diseases. The relationship of the complement fixation titre and the actual immunity of a given animal is not absolute. Immunity may develop before a rise in the complement fixing titre and may persist strongly as the complement fixing titre is falling as has been noticed in hyperimmune animals.

K. R. Heath

*2034—PROKOP, O. & OESTERLE, P., 1958. "Zur Frage der P-Antigenität von Echinokokkenflüssigkeit aus Schweinelebern." *Blut. Munich*, 4 (3), 157-158.

2035—RIDGES, A. P. & AUGUSTIN, R., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] "Immuno-chemical studies of sera and host-parasite relationships." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (1), 6-7.

2036—SAVCHUK, O. E., 1958. [Odesski universitet imeni Mechnikova, U.S.S.R.] [Effect of *Ascaris* toxins on production of immune bodies.] *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii. Moscow*, 29 (9), 127-129. [In Russian.]

Experiments on 18 rabbits, immunized with a *Brucella* culture, showed that introduction of *Ascaris* body fluid into their system resulted in: (i) deterioration of the general condition and in some cases death, (ii) inhibition of antibody production (agglutinins) and (iii) inhibition of leucocyte phagocytosis.

N. Jones

2037—SILVA, J. R. DA, 1957. [Faculty of Medical Science, U.D.F., Rio de Janeiro, Brazil.] "Esquistosomoses e imunidade. Estudo de revisão e critica." *Revista Brasileira de Medicina*, 14 (6), 409-412.

2038—TAYLOR, E. L., 1960. [Central Veterinary Laboratory, Ministry of Agriculture, New Haw, Weybridge, Surrey, U.K.] "The place of vaccines in the control of parasitic bronchitis in cattle." *Veterinary Record*, 72 (34), 684-688.

The author reviews the work leading up to the production of the irradiated *Dictyocaulus viviparus* vaccine and emphasizes the epidemiological approach to vaccination against parasitic bronchitis. The danger of building up a susceptible population which could succumb to infection on exposure is stressed. The importance of mother's milk is stressed with instances of severe husk amongst calves from dairy cows but not from Hereford calves which are allowed to graze with the mother, picking up a gradual immunizing level of larvae. Various questions are posed, such as the duration of the artificially acquired immunity and how it compares with naturally acquired immunity, what sort of infection is required on pastures, and vaccination schedules for calves and adults.

K. R. Heath

2039—VOORHORST, R., 1957. "Eosinophilia of mice experimentally infected with *Ascaris*." *Acta Allergologica. Copenhagen*, 11 (3), 170-171.

[This is an English translation of a paper published in *Ned. Tijdschr. Geneesk.*, 1957, 101, p. 1849. For abstract see No. 2040 below.]

2040—VOORHORST, R., 1957. "Eosinofilie bij experimenteel met ascaris besmette muizen." *Nederlandsch Tijdschrift voor Geneeskunde*, **101** (39), 1849.

Mice infected orally with 30,000 ova of pig *Ascaris* develop a blood eosinophilia 10 to 15 days after exposure; bone marrow eosinophilia appears two days earlier. Parenteral injection of an ascaris antigen also increases the number of eosinophils but not as much. After a second infection the peak of eosinophils reappears between the 10th and 15th days. That mice are sensitized by one infection may be demonstrated by the migration of eosinophils to the site of an intraperitoneal injection of ascaris antigen and the appearance of anaphylactic shock.

S. Willmott

***2041**—VOORHORST, R., 1958. "Eosinophilie bei experimentell mit *Ascaris suis* infizierten Mäusen." *Allergie und Asthma. Leipzig*, **4** (4/5), 265-270.

2042—ZOZULYA, Y. A. & SKLYARENKO, N. I., 1958. [Ukrainski nauchno-issledovatel'ski institut neirokhirurgii, U.S.S.R.] [Significance of the complement fixation reaction with *Cysticercus* antigen in the diagnosis of cerebral cysticerciasis.] *Voprosi Neurokhirurgii*, **22** (5), 28-33. [In Russian.]

The complement fixation test with *Cysticercus* antigen (method after Bobrov & Voznaya, 1939) was positive in 97 out of 792 persons suspected of cerebral cysticerciasis. 90 tests were done on blood with 84 positive and 80 on cerebrospinal fluid with 53 positive. *Cysticerciasis* was confirmed in 46 cases; 24 had tumours, 21 inflammatory infections and 6 other conditions. An analysis of the results has shown that in cases of tumours and particularly inflammatory processes in the brain, the reaction was generally positive when blood was used but negative when the cerebrospinal fluid was used, while in cases of cysticerciasis both tests were generally positive.

G. I. Pozniak

Anthelmintics

2043—ALVES, W., HARPER, J. & HILL, J., 1961. [Malaria & Bilharzia Research Laboratory, Salisbury, Southern Rhodesia.] "Preliminary field trials with M & B 2948A in *Schistosoma haematobium* infections in man." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (1), 40-43.

As the synthetic compound 1-p-aminophenoxy-5-phthalimidopentane (M & B 2948A) had shown a high degree of anti-schistosomal activity in mice and very low incidence of ocular disturbances in cats, its potential value for mass treatment in human infections with *Schistosoma haematobium* was tested orally on African children and adolescents. Although the percentage of presumptive cures with 120 mg. to 370 mg. per kg. body-weight over two to five days was disappointing (37% of 173 cases followed up for three months), there was often considerable anti-schistosomal effect with much less loss of blood, the passage of many degenerate eggs and a reduction of miracidial hatching.

R. T. Leiper

2044—BHADURI, N. V. ET AL., 1958. "Tetrahydrocardol in the treatment of helminthiasis of man." *Bulletin of the Calcutta School of Tropical Medicine*, **6** (1), 18-19.

A powder prepared by hydrogenation of cardol, one of the fractions of an extract of the shell of cashew nuts, was given in hard gelatin capsules in the dosage of 5 gm. to 6 gm. to 26 adults with hookworm infection. Six out of 22 of the patients re-examined 15 days later were absolutely cured and in six more the egg count had been lowered by 50% or more. Of ten adults with *Ascaris* infection, two out of the seven re-examined were cured.

R. T. Leiper

2045—BROOME, A. W. J., 1961. [Imperial Chemical Industries Ltd., Pharmaceuticals Division, Research Laboratories, Alderley Park, Cheshire, U.K.] "Preliminary observations on the mode of action of methyridine." *Veterinary Record*, **73** (8), 168-169.

All regions of the alimentary canal are reached whether 2-(β -methoxyethyl) pyridine or methyridine is administered by the oral or the subcutaneous route; greater concentrations in the stomach or abomasum follow oral, and higher levels in the small and large intestines follow subcutaneous administration. The drug readily passes from blood to gut and vice versa, according to concentration gradient, in all regions of the alimentary canal except the

stomach; in this way it makes close contact with all worms, even if they are embedded in or beneath the mucosa, thus giving a broad spectrum of anthelmintic activity. The possibility that the drug is metabolized to more active compounds is rejected. *In vitro* anthelmintic activity decreases with pH so that although concentrations reached in the stomach or abomasum are extremely high the drug is less effective against abomasal than intestinal parasites. The period of maximum drug concentration in the gut is short, but sufficiently high to produce "irreversible paralysis" of the parasite—a neuromuscular inhibition which cannot be reversed by acetylcholine. There appears to be sufficient difference between the sensitivity of the nematode and vertebrate neuromuscular systems to allow a safe therapeutic margin.

W. M. Fitzsimmons

- 2046**—BURROWS, R. B., CLAPHAM, P., RAWES, D. A., COPP, F. C. & STANDEN, O. D., 1960. [Wellcome Research Laboratories, Tuckahoe, New York, U.S.A.] "A new anthelmintic for canine hookworm." [Correspondence.] *Nature, London*, **188** (4754), 945–946.

Bephenium hydroxynaphthoate, although highly effective against hookworm in the dog, has an emetic action in this animal. The related compound known as 611C55, of which the formula is given, is more effective against *Ancylostoma caninum* and *Uncinaria stenocephala* in the dog and, at effective therapeutic levels, is only minimally emetic. There is evidence to suggest that it is also more effective against *Toxocara canis* and *Toxascaris leonina*. By contrast, 611C55 is less effective than bephenium against some gastro-intestinal trichostrongyles in sheep. The two drugs are of equal activity against *Nippostrongylus muris* and *Nematospiroides dubius* and have similar rather low activities against *Aspiculuris tetraptera* and *Syphacia obvelata*.

W. M. Fitzsimmons

- 2047**—DRUDGE, J. H. ET AL., 1961. [Kentucky Agricultural Experiment Station, Lexington, Kentucky, U.S.A.] "Anthelmintic activity of four organic phosphates in cattle." *Veterinary Medicine*, **56** (3), 135–138.

0,0-dimethyl 0-2,4,5 trichlorophenyl phosphorothioate (Ronnel), given as a bolus at 100 mg. per kg. body-weight, or as a 10% pre-mix in the feed as seven daily doses of 15 mg. per kg. body-weight or three daily doses of 35 mg. per kg., and 4-tert-butyl-2-chloro-phenyl methyl methylphosphoromide (Ruelene) at 44 mg. per kg. as a drench, both exhibited anthelmintic activity against nematodes (mainly trichostrongylids) in cattle. Ronnel and 0,0-diethyl 0-(3-chloro-4-methyl-7-coumarinyl) phosphorothioate (Co-Ral) applied as a spray and 0,0-dimethyl S_a-mercapto-N-methylacetamidodithiophosphate (Dimethoate) *per os* in the feed did not reduce faecal egg counts.

W. M. Fitzsimmons

- 2048**—FEBLES, Jr., F., BROOKE, M. M., JANOWSKY, C. C. & PERRI, A. M., 1960. [Communicable Disease Center, Public Health Service, Department of Health, Education & Welfare, Atlanta, Georgia, U.S.A.] "Out-patient tolerance and anthelmintic activity of new formulations of dithiazanine." *American Journal of Tropical Medicine and Hygiene*, **9** (4), 415–418.

Three new formulations of dithiazanine with longer disintegration times than those of the present commercial product were significantly better tolerated in a test of 426 hospital out-patients infected with *Trichuris trichiura*. A formulation containing methyl cellulose (taking 60 to 90 minutes to disintegrate) was tolerated almost as well as a placebo. The new formulations were as effective against *T. trichiura* as the commercial product. Insufficient infections with *Ascaris lumbricoides*, hookworm and *Strongyloides stercoralis* were included in the study to determine the effectiveness of the new formulations against these infections. J. W. Smith

- 2049**—FOLSE, D. S., 1961. [Kansas State College, Manhattan, Kansas, U.S.A.] "Phenothiazine: an annotated bibliography through 1958." *Technical Bulletin. Kansas State University of Agriculture and Applied Science*, No. 115, 216 pp.

Folse has collected the titles of the 1,586 articles published between 1934 and 1958, inclusive, on the chemistry, toxicity and insecticidal, anthelmintic, bactericidal and fungicidal activity of phenothiazine. The titles with brief annotations are grouped under year of publication. There is also an authors' index and a subject index, both arranged alphabetically. R. T. Leiper

- 2050**—FORSYTH, B. A., SCOTT, M. T. & BAINBRIDGE, J. R., 1961. [ICIENZ Merrindale Biological Research Station, Croydon, Victoria, Australia.] "Phenothiazine. I. The effect of purity and "dose area" on its anthelmintic efficiency in sheep." **Veterinary Record**, **73** (4), 67-75.

This paper describes experiments and experimental methods used to show that the anthelmintic efficiency of phenothiazine improves with increasing purity and higher "dose areas". "Dose areas" is defined as "a product of dose in grams and fineness measured by specific surface area in cm.² per gm." [The nature of this paper is such that it does not lend itself to abstracting and it should be read in the original.] W. M. Fitzsimmons

- 2051**—GRACEY, J. F. & KERR, J. A., 1961. [Veterinary Research Laboratory, The Farm, Stormont, Belfast 4, Northern Ireland.] "Some observations on the action of methyridine in lambs." **Veterinary Record**, **73** (8), 171-172.

In October 40 out of 80 six-month-old lambs with similar average worm egg counts and body-weight received a subcutaneous injection of methyridine, i.e. 2-(β -methoxyethyl) pyridine, at the rate of 200 mg. per kg. body-weight. The egg count dropped rapidly in the first five days and, within 24 days, it averaged only 69 as against 623 in the untreated controls. Within 38 days of treatment the lambs gained an average of 3½ lb. more in weight than the controls without supplementary food on autumn grazing. The average total worm count was 412 in those treated and almost 6,000 in the controls. Differential counts showed the main worm burden to be due to *Trichostrongylus* and *Strongyloides* with *Ostertagia* fairly high—all were markedly reduced; less severe infections with *Cooperia*, *Haemonchus contortus* and *Bunostomum* were completely eliminated. One case of abscess formation at the site of injection has so far been observed. The possibility of haemolytic strains of *Escherichia coli* aggravating parasitic gastroenteritis is mentioned and combined antibiotic and anthelmintic therapy is suggested. W. M. Fitzsimmons

- 2052**—HAMILTON, J., 1961. [95, High Street, Kirkby Stephen, Westmorland, U.K.] "Some observations on the use of methyridine in the field." **Veterinary Record**, **73** (8), 169-171.

Hamilton gives clinical case reports of cattle suffering from severe parasitic gastro-enteritis which made spectacular recoveries after one treatment with 200 mg. per kg. body-weight of methyridine (2-(β -methoxyethyl) pyridine) administered as a subcutaneous injection. He considers that results were superior to those that would have been obtained with phenothiazine therapy. He points out that methyridine can only be expected to be effective in straightforward parasitic gastro-enteritis and not where the illness is complicated by secondary conditions such as Johne's disease or when the patient is practically moribund at the time of treatment. W. M. Fitzsimmons

- 2053**—KINGSBURY, P. A., 1961. [The Cooper Technical Bureau, Berkhamsted, Herts, U.K.] "Phenothiazine synergists." [Correspondence.] **Veterinary Record**, **73** (8), 183-184.

Kingsbury, in a preliminary communication, reports that when organo-phosphorus anthelmintics and phenothiazine are given to sheep as a mixture superior anthelmintic efficiency against nematodes is achieved than when either are administered independently. This synergistic phenomenon is particularly valuable in the case of *Trichostrongylus* spp. of the small intestine. Detailed reports are being prepared for publication by the author. W. M. Fitzsimmons

- 2054**—KNIGHT, R. A., MCGUIRE, I. A. & WALTON, L., 1960. [Regional Animal Disease Laboratory Substation, Agricultural Research Service, USDA, State College, Mississippi, U.S.A.] "Mississippi tests on a new anthelmintic in sheep." **Veterinary Medicine**, **55** (10), 71-74.

Lambs between 150 and 180 days old were dosed orally with the organic phosphorus compound Bayer 21/199, formula 0,0-diethyl 0-(3-chloro-4-methyl-7-coumarinyl) phosphorothioate in a water suspension of 25% wettable powder at the rate of 15 mg. of active material per kg. body-weight. No effort was made to effect closure of the oesophageal groove. Of 45 lambs

treated eight died. A few animals received a second dose 12 weeks later and showed no cumulative effect. The drug was effective against *Haemonchus contortus*, *Cooperia* spp. and, to an uncertain degree, against *Trichostrongylus colubriformis* and *Nematodirus* spp. 100% efficiency against *Strongyloides papillosus* as reported by Herlich & Porter was not confirmed, but this may have been due to reinfection. The degree of toxicity was intermediate between that found by Gordon [for abstract see Helm. Abs., 27, No. 12f] and Herlich & Porter [for abstract see Helm. Abs., 27, No. 168a]. More investigation is needed before the drug can be recommended as an anthelmintic for sheep. W. M. Fitzsimmons

- 2055—KOTARBA, C., MARKIEWICZ, Z., MARKIEWICZ, K. & STANKIEWICZ, W., 1958. [Klinika Chorób Wewnętrznych, Wydział Weterynaryjny Szkoły Głównej Gospodarstwa Wiejskiego, Warszawa, Poland.] "Badania nad skutecznością piperazyny w robaczycach jelit u zwierząt użytkowych." *Roczniki Nauk Rolniczych. Seria E. Weterynarii*, 68 (3), 293–313. [English & Russian summaries pp. 310–313.]

The efficacy of pure piperazine (Polish product) and of effervescent piperazine in 0.1 gm. tablets containing citric acid, was tested against helminths in 48 dogs, 40 foxes, 22 pigs, five horses and five cats. [For abstract of an earlier report of this work see Helm. Abs., 25, No. 890bd.] The drug proved effective against *Toxocara canis*, *T. mystax*, *Toxascaris leonina*, *Ascaris suum*, *Parascaris equorum* and, to a lesser extent, *Strongylus vulgaris*, but not against *Ancylostoma caninum*, *Uncinaria stenocephala*, *Trichuris vulpis* or *Dipylidium caninum*. The effective dose, which was spread over four days, was 50 mg. per kg. body-weight for small animals (cats, puppies, fox cubs, piglets) and 100 mg. to 150 mg. per kg. for adult and large animals. In heavy or mixed infections and in those with intestinal complications the dosage should be increased to at least 100 mg. per kg. A 5% sterile solution of piperazine in physiological saline, injected in doses of 100 mg. per kg. abdominally or intravenously to dogs, caused passing unrest, shortness of breath and vomiting, and injected subcutaneously or extravenously it caused diffuse hot and painful swelling. G. I. Pozniak

- 2056—KOZAI, I., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [Re-evaluation of sodium nitrite as the ovicide used in nightsoil, 2.] *Japanese Journal of Parasitology*, 9 (5), 519–528. [In Japanese: English summary p. 528.]

When the temperature was about 28°C. the ovicidal effect of sodium nitrite on *Ascaris* ova was greatest when it was mixed with nightsoil (1:2,000 to 4,000) 24 hours after it had been treated with 3 gm. of calcium superphosphate per 50 ml. When the temperature was around 5°C. the ovicidal effect of sodium nitrite remained almost unchanged in nightsoil (1:1,000), to which 4 gm. of calcium superphosphate per 50 ml. had been added 24 hours earlier. At high temperatures when the two chemicals were to be used simultaneously, the amount of sodium nitrite should be doubled to obtain the same effect. Y. Yamao

- 2057—KOZAI, I., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] [Re-evaluation of sodium nitrite as the ovicide used in nightsoil, 3.] *Japanese Journal of Parasitology*, 9 (5), 529–540. [In Japanese: English summary p. 540.]

The ovicidal effect of a mixture of sodium nitrite and calcium superphosphate in various proportions in night soil was tested; the mixture proved to be as effective as previously reported by the author in laboratory experiments. Kozai stated that it also enhanced the value of the nightsoil as a fertilizer. Y. Yamao

- 2058—KROTOV, A. I., 1958. [Institut malyarii, meditsinskoj parazitologii i gelmintologii, Moskva, U.S.S.R.] [Effect of the physiological condition of ascarids on the rapidity of their death in oxygen.] *Byulleten Eksperimentalnoi Biologii i Meditsini*, 46 (8), 98–100. [In Russian: English summary p. 100.]

Compounds (e.g. chloral hydrate) with a depressing effect on the mobility of pig *Ascaris* raise the catalase activity of the worms, while an electric current and compounds with a stimulating effect (e.g. santonin, piperazine, chenopodium oil, heptylresorcinol and thymol) reduce catalase activity to zero. In the latter case, worms in an oxygen medium are unable to

neutralize the accumulating hydrogen peroxide and this leads to their rapid death. The use of small doses of santonin or piperazine two to three hours before oxygen therapy will, therefore, raise the efficacy of the oxygen and should be further tested.

G. I. Pozniak

2059—MALHEIRO, D. DE M., 1958. [Departamento de Zoologia e Parasitologia, Universidade de São Paulo, Brazil.] "Ação anti-helmíntica da água oxigenada." **Revista da Faculdade de Medicina Veterinária, São Paulo**, 6 (2), 187-218. [English summary pp. 211-214.]

This is an account of *in vitro* and *in vivo* tests of the effects of hydrogen peroxide with and without the addition of a trace of potassium cyanide solution on certain helminths. On *Ascaridia galli* it had a definite effect *in vitro*, the addition of potassium cyanide reinforcing it. The action may be inversely proportional to the catalase, reductase and peroxidase present in the different species of parasite. *In vivo* nemata of both the solutions were given to 51 dogs, some serving as controls without either solution. However, the extent of infection of São Paulo street dogs is so variable that the results were not conclusive. The addition of a potassium cyanide solution did not have any marked effect *in vivo*.

W. K. Dunscombe

2060—SCARNELL, J., 1961. [The Animal Health Trust, Equine Research Station, Newmarket, Suffolk, U.K.] "Local reactions following subcutaneous injection of 'Promintic'." [Correspondence.] **Veterinary Record**, 73 (11), 278-279.

Scarnell reports local reaction to 20 c.c. of methyridine [2-(β -methoxyethyl) pyridine], administered subcutaneously, in four pony yearlings. The reaction was marked in three cases; in two of these chemical necrosis and sloughing occurred, in the most chronic of which simple surgical treatment was necessary and a small area of necrosis in the underlying muscle was seen.

W. M. Fitzsimmons

2061—TURPIN, R., CAVIER, R. & SAVATON-PILLET, J., 1957. "Etude des propriétés anthelminthiques du sébacate de pipérazine." **Thérapie. Paris**, 12 (1), 56-67. [English & Spanish summaries p. 67.]

After preliminary testing against *Rhabditis macrocerca* *in vitro* and *Aspiculuris tetraptera* in mice and finding piperazine sebacate effective and with a wide margin of safety, the authors tested this chemical against enterobiasis in 32 children, ascariasis in five (of which one had *Trichuris* also) and trichuriasis in three. Of these, 30 of those with enterobiasis, all of those with ascariasis and three of those with trichuriasis were cured. The drug was given in tablet form, each tablet containing 0.25 gm., the recommended dose in 24 hours being four tablets for those aged 30 months to six years, eight tablets for those six to ten years old and 12 tablets for those over 10 years. Tolerance was remarkably good and the authors consider piperazine sebacate to have a number of advantages over the diphenylacetate and dilaurate.

S. Willmott

2062—WALLEY, J. K., 1961. [Imperial Chemicals Industries Ltd., Pharmaceuticals Division, Alderley Park, Macclesfield, Cheshire, U.K.] "'Promintic'—a new anthelmintic for sheep and cattle." [Correspondence.] **Veterinary Record**, 73 (1), 20.

Walley, in a short preliminary communication on the liquid Promintic (2-(β -methoxyethyl) pyridine) [methyridine], states that it has pronounced anthelmintic activity when administered orally and is slightly more active against intestinal worms when given subcutaneously. At a dosage of 200 mg. per kg. body-weight in sheep and cattle it is very effective against both immature and mature intestinal species of the genera *Trichostrongylus*, *Nematodirus*, *Cooperia* and *Trichuris* and somewhat less effective, yet still useful against abomasal nematodes.

W. M. Fitzsimmons

2063—WALLEY, J. K., 1961. [I.C.I. Ltd., Pharmaceuticals Division, Research Laboratories, Alderley Park, Cheshire, U.K.] "Methyridine—a new anthelmintic for sheep and cattle." **Veterinary Record**, 73 (8), 159-168.

Eleven tables summarize in detail the results of trials on 435 cattle and 491 sheep designed to ascertain the efficacy of 2-(β -methoxyethyl) pyridine, or methyridine, at the optimum dosage of 200 mg. per kg. body-weight given orally or subcutaneously, against helminth

parasites mainly of the abomasum, intestine and caecum but also of the lungs and liver. Consistently good results were obtained against *Trichostrongylus* spp. in the abomasum and *Ostertagia* spp., *Trichostrongylus* spp., *Cooperia* spp. and *Nematodirus* spp. in the small intestine and *Trichuris* spp. of the caecum and large intestine as well as against immature forms of all these species in both sheep and cattle. The action against *Haemonchus* and *Ostertagia* in the abomasum was subject to variation and less striking although still significant. Segments and a few heads of *Moniezia* were expelled within 48 hours of treatment but all heads were not expelled and tapeworms grew again. A slight action against *Dictyocaulus* was noted—a removal of 27% to 69% was effected. No useful activity could be demonstrated against liver-fluke. Deaths occur in sheep and cattle with doses of 400 mg. per kg. body-weight. They are due to neuromuscular block resulting in respiratory depression.

W. M. Fitzsimmons

2064—WOLFF, A., 1960. "A practical field test of anthelmintics." *Veterinary Medicine*, **55** (7), 70–71.

Tests were carried out with three different proprietary brands of phenothiazine and a proprietary anthelmintic consisting of copper nicotine sulphate and carbon tetrachloride. The tests were made on a flock of farm ewes and lambs running together but divided into lots for each anthelmintic, one lot remaining undosed as a control. Effectiveness was measured by weight gains of the lambs over a 93-day period. The average daily weight gain for the untreated controls was 0.157 lb., for the three brands of phenothiazine 0.377 lb., 0.514 lb. and 0.420 lb. respectively and for the copper nicotine sulphate and carbon tetrachloride mixture 0.507 lb. The author considers that these results suggest a real difference between brands of anthelmintic available on the market.

W. M. Fitzsimmons

2065—YOSHIDA, Y., NAKANISHI, Y., SHIMATANI, T. & MATUO, K., 1960. [Department of Medical Zoology, Kyoto Prefectural University of Medicine, Kyoto, Japan.] "Comparative studies on the anthelmintic effect of bephenium hydroxynaphthoate, tetrachlorethylene, 1-bromo- β -naphthol and 4-iodothymol against the human hookworm." *Japanese Journal of Parasitology*, **9** (5), 620–628. [Japanese summary p. 628.]

The anthelmintic effect against hookworms of a single dose of 2.5 gm. or 4.0 gm. of bephenium hydroxynaphthoate was approximately equal to that of a single dose of 4.5 gm. of tetrachlorethylene. Bephenium hydroxynaphthoate was inferior to 1-bromo- β -naphthol and superior to 4-iodothymol as an anthelmintic. Side effects with bephenium hydroxynaphthoate were observed in a considerable number but less than with tetrachlorethylene, 1-bromo- β -naphthol and 4-iodothymol. It was unnecessary to take any purge with these anthelmintics. It was reconfirmed that bephenium hydroxynaphthoate had a marked effect against human ascarids.

Y. Yamao

History

2066—CERQUEIRA FALCÃO, E. DE, 1959. [Caixa Postal 796, Santos, Brazil.] "Professor Pirajá da Silva, incontestable discoverer of *Schistosoma mansoni*." *Zeitschrift für Tropenmedizin und Parasitologie*, **10** (2), 146–153.

Falcão, again reiterates arguments previously presented by him in two volumes, privately printed and circulated in 1953 and 1957, and in various lectures and broadcasts in Brazil during the past nine years, in support of his belief that the credit for the recognition and specific determination of *Schistosoma mansoni* (Sambon, 1907) and its intermediate host, belongs to Pirajá da Silva who, in December 1908, published a description of the adults in *Brazil Medico* and, with verbal emendations, in the *Journal of Tropical Medicine and Hygiene* and *Archives de Parasitologie*, 1909. Pirajá da Silva, also had described in 1912 under the name *Cercaria blanchardi* a cercaria from *Planorbis bahiensis* which Lutz, in 1916, showed, by animal experiments, to be one of the intermediate hosts of *S. mansoni* in South America.

R. T. Leiper

- 2067**—GOFFART, H., 1960. "Phytonematologie in Deutschland." *Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft*, No. 99, pp. 14–24.
The history of nematode diseases of plants in Germany is reviewed from the time of Steinbuch's work in 1799 on the grass nematode, *Anguina* sp., to that of Kühn and others on *Heterodera schachtii* from the middle of the nineteenth century onwards, and in the present century work on other species of *Heterodera*, *Ditylenchus dipsaci*, *Aphelenchoides* spp., the free-living nematodes and root-knot nematodes. Methods of control are mentioned and there is a list of the most important plant parasites found in Germany and their chief hosts. M. T. Franklin

Hyperparasitism

- 2068**—CORT, W. W., HUSSEY, K. L. & AMEEL, D. J., 1960. [School of Public Health, University of North Carolina, Chapel Hill, U.S.A.] "Studies on a microsporidian hyperparasite of strigeoid trematodes. I. Prevalence and effect on the parasitized larval trematodes." *Journal of Parasitology*, **46** (3), 317–325.
Cort, Hussey & Ameel find that a large proportion of the mother and daughter sporocysts and cercarial embryos of 12 species of strigeoids parasitizing snails in the Douglas Lake area of Michigan are hyperinfected with a species of *Nosema*. However, few of the hyperinfections are spore-producing, most showing only early stages of schizogony. Thus cercarial production is not greatly affected, but heavy infections do injure cercariae to the extent that they cannot escape from the snail; emerged cercariae seem to be free of infection. E. I. Sillman

- 2069**—CORT, W. W., HUSSEY, K. L. & AMEEL, D. J., 1960. [School of Public Health, University of North Carolina, Chapel Hill, U.S.A.] "Studies on a microsporidian hyperparasite of strigeoid trematodes. II. Experimental transmission." *Journal of Parasitology*, **46** (3), 327–336.
Cort, Hussey & Ameel experimentally transmitted *Nosema* sp., a hyperparasite of strigeoid trematodes, by feeding its spores to snails. The feeding of large numbers of spores initiated very heavy infections affecting most of the strigeoid larval stages and culminating in the production of large numbers of spores within 21 days, a striking contrast with the type of development in nature [see abstract No. 2068 above]. The authors suggest that some type of resistance is induced in natural infections, which are presumably produced by the ingestion of a few spores, whereas in experimental infections produced by a large number of spores, this resistance may have been overwhelmed. E. I. Sillman

- 2070**—DEMIDOVA, N. V., 1958. [Vsesoyuzni selskokhozaistvenni institut zaochnogo obrazovanya, U.S.S.R.] [Hyperparasitism in *Bunostomum trigonocephalum*.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 127–129. [In Russian.]
Demidova has frequently found *Bunostomum trigonocephalum* attached to *Moniezia* freshly recovered from sheep. Both males and females were deeply embedded with their cephalic ends in the proglottides and caused macroscopically visible changes. N. Jones

Evolution

- 2071**—FIGULEVSKI, S. V., 1958. [Dagestan gosudarstvenni universitet, U.S.S.R.] [The phylogeny of flatworms.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday*. Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 263–270. [In Russian.]
Figulevski has studied the phylogenetic relationships in flatworms basing his work on comparative embryological data and draws three original general schemes tracing the evolution of trematodes, the evolution of cycles of development of trematodes, and the evolution of flatworms. G. I. Pozniak

- 2072—POPOVA, T. I., 1958. [Moskovski gosudarstvenni universitet, U.S.S.R.] [The phylogenetic interrelationships of nematodes of the superfamily Strongyloidea Weinland, 1858.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 279–284. [In Russian.]

Popova briefly discusses the work of Skryabin (1941, 1946, 1952), Dougherty (1949) and Shults (1952) on the phylogeny of Strongylata and draws her own evolutionary tree based on the structure of the buccal region. She accepts that Prostrongylata have originated from the Rhabditata. Two branches at the base of the tree lead to the Trichostrongyloidea and the Metastrongyloidea (of which the Syngamidae are an offshoot). At the base of the main stem—the Prostrongyloidea—are the Amidostomatidae from amphibia and then the Diaphanocephalidae from reptiles. Evolution of the Strongyloidea then proceeds in two directions; (i) to forms without a crown at the oral opening giving rise to the well advanced Ancylostomatidae, and (ii) forms with a crown giving rise first to the Cloacinidae, then the Trichonematidae and finally the Strongylidae. Stephanuridae, containing one insufficiently studied species, is provisionally placed at the base of the Strongylidae branch. G. I. Pozniak

Nomenclature

- 2073—LEVINE, N. D., 1958. [College of Veterinary Medicine, University of Illinois, Urbana, Illinois, U.S.A.] "Uniform endings for the names of higher taxa." **Systematic Zoology**, Washington, D.C., 7 (3), 134–135.

The Colloquium on Zoological Nomenclature at Copenhagen in 1953 gave the opinion that there should be no prescribed terminations for the names of the Order/Class group and the Phylum group, and there are none for the higher taxa in the New Code adopted by the Colloquium held in London in 1958. Levine suggests the following as readily distinguishable endings: Superclass, -asica; Class, -asida; Subclass, -asina; Superorder, -orica; Order, -orida; Suborder, -orina; Superfamily, -icae; Family, -idae; Subfamily, -inae; Supertribe, -ibica; Tribe, -ibida and Subtribe, -ibina.

R. T. Leiper

- 2074—TRIPATHI, Y. R., 1960. [Central Inland Fisheries Research Station, Tungabhadra Dam, India.] "Change of name of *Diploptrema barbi* Tripathi, 1959." **Indian Journal of Helminthology**, Year 1959, 11 (1/2), 116.

The name *Diploptrema barbi* Tripathi, 1959 is changed to *Neodiplozoon barbi* nom.nov. as the generic name is preoccupied by *Diploptrema* Spencer, 1900.

M. Beverley-Burton

Miscellaneous

- 2075—ABROSIMOV, I. S., 1958. [Helminthological instruction of students in a secondary school.] **Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday.** Moscow: Izdatelstvo Akademii Nauk SSSR, pp. 23–27. [In Russian.]

- 2076—ARGUMOSA, J. A. DE, 1960. "Superfamilia Filarioidea." **Medicina. Revista Mexicana**, 40 (852), 428–431.

- 2077—DINULESCU, G. ET AL., 1957. "Observații asupra frecvenței unor helmintoze la oameni și interferența acestora cu helmintozele ciinilor." **Studii și Cercetări de Inframicrobiologie, Microbiologie și Parazitologie**, Bucharest, 8 (2), 297–303. [French & Russian summaries.] The total incidence of helminthiasis among 421 persons employed at kennels in Rumania was 34.94%. The predominating species were: *Ascaris lumbricoides* (12.58%), *Trichuris trichiura* (23.58%), *T. vulpis* (6.10%) and *Enterobius vermicularis* (4.47%). Examinations of 918 dogs from the kennels revealed the prevalence of *Ancylostoma caninum* (85.51%), *Toxascaris leonina* (48.38%), *Trichuris vulpis* (42.15%) and *Toxocara canis* (14.40%). N. Jones

- 2078**—EICHLER, W., 1957. [Parasitologisches Institut der Karl-Marx-Universität, Leipzig, East Germany.] "Gekürzte systematische Übersicht der wichtigsten Parasitengruppen von veterinärmedizinischer Bedeutung." *Acta Veterinaria. Budapest*, **7** (4), 465–472.
Eichler gives a concise classifying list of the systematic units down to family level of those parasites (including Platyhelminthes and Aschelminthes) which are most important in veterinary and medical science.
G. I. Pozniak
- 2079**—KHROMOV, A. S. & FEDOROVA, S. P., 1960. [Otdel epidemiologii, Institut meditsinskoi parazitologii i tropicheskoi meditsini imeni E. I. Martsinovskogo, Ministerstvo zdravookhraneniya SSSR.] [The parasitological situation in the Republic of Guinea. (Review of the literature).] *Meditsinskaya Parazitologiya i Parazitarnie Bolezni. Moscow*, **29** (5), 614–617. [In Russian.]
- 2080**—LEVASHOV, M. M., 1958. [Permski meditsinski institut, U.S.S.R.] [History and methodology in helmintho-geography.] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR*, pp. 195–199. [In Russian.]
Levashov quotes and discusses various Russian works dealing with the concept of the parasitic organism in relation to its surrounding medium, i.e. the host and its ecological and geographical situation. He proposes the terms "bioaerocoenosis" for groups of organisms in terrestrial surroundings and "biohydrocoenosis" for groups of organisms in aquatic surroundings.
G. I. Pozniak
- 2081**—LEWIS, D. J., LYONS, G. R. L. & MARR, J. D. M., 1961. [London School of Hygiene & Tropical Medicine, Department of Parasitology, London, W.C.1, U.K.] "*Simulium damnosum*: (1) Ovaries of preserved nulliparous and parous flies. (2) *Onchocerca* or similar worms in the palp." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (1), 12–13.
- *2082**—LÖLIGER-MÜLLER, B., 1957. "Die parasitischen Würmer, ihre Biologie und Bekämpfung. Teil II. Plattwürmer." *Wittenberg: Neue Brehm-Bücherei*, Heft 192, 67 pp.
- 2083**—MAHON, J., 1960. [Imperial College of Science & Technology, South Kensington, London, England.] "Ecology of parasites." [Report of meeting of the Parasitology Group of the Institute of Biology, London, October 30, 1959.] *Nature. London*, **185** (4709), 290–291.
- 2084**—SHIKHOBALOVA, N. P., 1958. [K. I. Skryabin and Soviet helminthology. (On the 80th birthday of Academician K. I. Skryabin).] *Papers on Helminthology presented to Academician K. I. Skryabin on his 80th Birthday. Moscow: Izdatelstvo Akademii Nauk SSSR*, pp. 3–12. [In Russian.]
- 2085**—SKRYABIN, K. I., 1958. [Internationalization of work on the studies of theoretical and applied helminthology.] *Vestnik Selskokhozyaistvennoi Nauki*, **3** (12), 57–58. [In Russian.]
While pointing out the insufficiency of international conferences and frequent inadequacies of publications from the point of view of international co-ordination of helminthological work, Skryabin suggests the creation of small international groups to deal with various helminthological problems. Among others, he stresses the necessity of establishing an international commission for experimental verification of individual anthelmintics.
N. Jones
- 2086**—THITASUT, P., 1961. [Department of Pathology, Siriraj Hospital Medical School, Bangkok, Thailand.] "Action of aqueous solutions of iodine on fresh vegetables and on the infective stages of some common intestinal nematodes." *American Journal of Tropical Medicine and Hygiene*, **10** (1), 39–43.
Thitasut investigated the concentrations of aqueous solutions of iodine required to kill the infective stages of *Necator americanus*, *Ancylostoma caninum*, *Strongyloides stercoralis*, *Ascaris lumbricoides*, *Toxocara canis* and *Trichuris muris*. Solutions containing 70 p.p.m. free iodine, prepared by dissolving commercially prepared tablets in distilled water, killed the infective

free larvae of hookworms and *Strongyloides* within five minutes or less at temperatures ranging from 15°C. to 30°C. To kill infective larvae in the eggs of *Ascaris*, *Toxocara* and *Trichuris* under similar conditions, concentrations of 100, 120 and 250 p.p.m., respectively, were required. Killing action was more rapid at the low than at the high temperatures. Solutions with concentrations up to 500 p.p.m. did not adversely affect the flavour or appearance of various common leaf and root vegetables. The author concludes that solutions of sufficient strength appear to be suitable for the disinfection of vegetables to be consumed fresh.

J. W. Smith

2087—WILLIAMS, T. R. & HYNES, H. B. N., 1961. [Liverpool School of Tropical Medicine, Department of Parasitology & Entomology, Liverpool, U.K.] "1. Feeding habits of *Simulium* larvae. 2. The maintenance of tropical crabs in a temperate laboratory." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 55 (1), 4.

2088—WILLMOTT, S., 1961. [Commonwealth Bureau of Helminthology, The White House, 103 St. Peter's Street, St. Albans, Herts, England.] "Research in parasitology." [Report of meeting of the Parasitology Group of the Institute of Biology, London, October 28, 1960.] **Nature, London**, 189 (4760), 192–193.

BOOKS

2089—CHATTERJEE, K. D., 1957. [R. G. Kar Medical College, Belgachia, Calcutta, India.] "Parasitology (protozoology and helminthology) in relation to clinical medicine." **Calcutta: K. D. Chatterjee**, 185 pp.

The author has reduced his larger "Human parasites and parasitic diseases" to a more handy size by omitting elaborate discussions and confining the text to the essentials with which a medical student should be familiar. Each of the parasites of man are now succinctly dealt with under geographical distribution, habitat, morphology, life-cycle, clinical and pathological features, diagnosis, treatment and prophylaxis. Details of various techniques used in diagnosis are relegated to an appendix. The volume contains 76 illustrations of which six are in colour.

R. T. Leiper

2090—MANSON-BAHR, P., 1960. "Manson's tropical diseases. A manual of the diseases of warm climates." **London: Cassell & Co. Ltd.**, 15th edit., xiv+1177 pp.

2091—STAKMAN, E. C. & HARRAR, J. G., 1957. "Principles of plant pathology." **New York: Ronald Press Co.**, xi+581 pp.

2092—TARJAN, A. C., 1960. "Check list of plant and soil nematodes. A nomenclatorial compilation." **Gainesville: University of Florida Press**, xiv+200 pp.

The need for an authoritative, up-to-date, taxonomic catalogue of plant-parasitic and soil-dwelling nematodes has been urgent for some time. Now Tarjan has compiled this check list which fulfils most of what such a work should be. From detailed use I have pleasure in praising it unreservedly. The check list contains about 3,000 names of species, subspecies, varieties and forms of plant-parasitic and free-living nematodes. Aquatic, marine, animal-parasitic and insect-parasitic species are not dealt with. The line had to be drawn somewhere and so these were excluded, except where incidentally they were described in genera normally recognized as plant or soil forms. Under each name is a chronological list of entries beginning with the original genus in which the species was placed and followed by generic names and synonyms to which the species has been referred. Each of these entries has a reference to

the authority for the transference. Occasionally there is a comment by Tarjan indicating that some specialist on a group has considered a species of doubtful status or that a genus is reckoned to be the valid one, but for the greater part the compilation is free from bias. The reader is given the basic data in full and is left to make his own decisions in accordance with his own particular view of systematics. The text is well set out, is remarkably free from error and omissions (I have detected a mere handful that are easily checked). The work is doubly valuable because of the long list of cited literature in which about 900 references are given. The entries relate to species described or allocated up to 1959. There are a few references dated 1960 and it is to be expected that not all those that appeared in 1959 have been covered. I hope Tarjan will be enabled to issue supplements from time to time, so keeping the work up to date and placing all nematologists, but particularly taxonomists, further in his debt.

J. B. Goodey

SUMMARY OF REPORTS

[Only those sections relating to helminthology are abstracted.]

2093—BRITAIN. "Report of the Nematology Department, Rothamsted Experimental Station, for 1959, by F. G. W. Jones." Harpenden: Rothamsted Experimental Station, pp. 111–116.

The department continued its work on *Heterodera* with respect to (i) the effect of various factors on the hatching and emergence of *H. göttingiana* from cysts; (ii) population studies on the potato, cereal and pea-root eelworms; and (iii) distribution in England and Wales of biotypes of *H. rostochiensis* capable of infecting crosses of *Solanum* containing the resistant gene H; and on *Aphelenchoides ritzema-bosi* with respect to (i) varietal differences in susceptibility of chrysanthemums; (ii) the development of a simple technique for infecting plants with a known number of worms; (iii) the inability of the worms to overwinter in soil without weeds; and (iv) the evaluation of several chemicals for its control, this marking the re-starting of work on nematocides. The photographic techniques developed have facilitated the study of the function of oesophageal muscles and vulvae in some nematodes and of the feeding of various predatory species on immature females of *H. trifolii*. An improved method for the extraction of eelworms from soil has been achieved; a number of nematodes have been aseptically cultured on lucerne seedlings and callus tissue in nutrient agar; the analysis of soil conditions affecting the hatching and movement of nematodes has been continued and a study of the nematode fauna from various known soils of New Zealand has been started. Interesting identifications included *Xiphinema diversicaudatum* (as originally described by Micoletzky) from separate localities and which has been shown to be a vector of the virus causing Arabis mosaic in plants; *X. pratensis*, *Tylenchorhynchus martini*, *Pratylenchus zeae*, *Rotylenchoides* sp. and *Trophurus* sp. from samples associated with virus diseased sugar-cane; and *P. coffeae*, new species of *Pratylenchus* and *Trophurus*, and *Tylenchulus semi-penetrans* (a new host record) from samples of manila hemp roots from North Borneo. G. I. Pozniak

2094—BRITAIN. "Department of Parasitology and Entomology, Incorporated Liverpool School of Tropical Medicine. 61st annual report for 1959–60, by W. E. Kershaw." Liverpool: pp. 39–44.

Current work at The Liverpool School of Tropical Medicine, as described in this 61st report, is concerned with: the epidemiology of, and relationships between the filariae of man and monkeys in the Cameroons and studies on the biological, chemical, mathematical and physical aspects of the transmission of *Loa loa* by *Chrysops*; the continued investigations into trichinellosis (which were started after the Liverpool outbreak in 1953), in which connection it is suggested that the development of the cortisone group of drugs may be of value in treating the infection; the study of onchocerciasis in man and animals together with observations on

the behaviour of certain fresh-water crabs known to associate with *Simulium*; and the effect on learning in rats of repeated low-grade chronic infections with schistosomes. Work on the immuno-chemistry of infections in poultry and of filariasis in man and animals is in its preliminary stages. In the clinical department dichlorophen has achieved notable success in the eradication of human tapeworm infections.

J. W. Smith

2095—EAST AFRICA, 1958. "East African Agriculture and Forestry Organization. Record of Research for 1956-1957. Plant nematology, by A. G. Whitehead." Nairobi: Government Printer, pp. 108-109.

This brief report of the first year's survey of East Africa for plant-parasitic eelworms records the occurrence of 22 genera, of which only *Meloidogyne* and *Ditylenchus* had previously been recorded from the area. All major crops are attacked, the most frequently recorded parasites being *Meloidogyne* spp. and *Pratylenchus* spp. Damage was caused experimentally by *Meloidogyne* sp. on potato, tomato and celery and by *Pratylenchus* sp. on dwarf beans. *Aphelenchoides ritzema-bosi* caused necrosis of leaf initials and retarded flowering of pyrethrum under conditions of high atmospheric humidity.

M. T. Franklin

2096—KENYA. "Annual Report of the Veterinary Department, 1959." Nairobi: Government Printer, 111 pp. [Helminths pp. 8, 24, 27.]

A further reduction in the incidence of *Cysticercus* infection among the European-owned cattle of the Athi River Factory is reported. A survey of the incidence of fascioliasis among sheep in Kenya is to be undertaken. African youths in the Embu district contracted trichinellosis and one died; circumstantial evidence indicates that they acquired the infection by eating wild pig. Continuing research into beef measles has involved chemo-therapeutic work including trials with Dow ET-57 and serological work using agglutination and complement fixation tests. The resistance of cattle to cysticerciasis, induced by oral dosage of *Taenia saginata* ova or by subcutaneous or intramuscular injection of oncospheres, is being investigated.

J. W. Smith

2097—NEW ZEALAND. "Report of the Department of Agriculture for the year ended 31st March, 1960." Wellington, N.Z.: Government Printer, 197 pp. [Helminths pp. 185, 187.]

The parasitology section reports on experiments carried out with some anthelmintics in sheep. The high efficiency of bephenium embonate against *Nematodirus* infection has been confirmed; Dipterex has shown good results against *Cooperia*, *Haemonchus*, *Nematodirus* and *Ostertagia*. In cases of post-weaning unthriftiness in lambs due to selenium deficiency, dosage with phenothiazine gave a greater response than selenium alone and there was an additive weight response when both phenothiazine and selenium were given. In one trial *Chabertia*, *Ostertagia* and *Trichostrongylus* counts were significantly higher for control lambs than for those dosed with selenium. Further trials are being designed to ascertain the smallest amounts of selenium, administered either orally or by subcutaneous injection at the greatest intervals of time, that will induce optimal growth rate in lambs.

J. W. Smith

REPORTS OF MEETINGS

Vth International Nematology Symposium, Ghent, Belgium, 24th-28th July, 1961

On 24th July, a large proportion (150) of the world's nematologists assembled at the State Agricultural College in Ghent to form the Vth International Nematology Symposium organized by the Society of European Nematologists.

In his inaugural address, Professor J. van den Brande welcomed those present and made special mention of the relatively large contingent from the non-European countries particularly from North America. Professor L. de Coninck gave the opening lecture entitled "Problems of Systematics and Taxonomy in Nematology to-day". This address was a strong indication of the demand for an increase in the study of nematode systematics. The remainder of the Scientific Programme was divided up into sections reflecting the chief fields of research, and the diversity of the topics included is illustrated by the following selection.

In France, M. Ritter has found different species of *Meloidogyne* to predominate in the different climatic regions. A. Oteifa described his observations on the galling of tomato plants invaded by *Meloidogyne javamica*, and measured the uptake and accumulation of P^{32} by the galled and healthy tissues. H. Sol gave a study of the way *Trichodorus pachydermis* is able to transmit the tobacco rattle virus and how the distribution of the virus in the soil is associated with that of the nematode. A. Coomans emphasized the high standard of observation now necessary in morphological studies. This was supported by W. Clark's very pertinent remarks on the source of error in the use of measurements as taxonomic criteria. C. Blake reported on the occurrence of *Radopholus similis* in bananas in New South Wales and discussed its histopathology, economic importance and methods of control. W. Mountain read a paper, produced jointly with C. McKeen, which showed how final populations of *Pratylenchus penetrans* on egg plant and tomato were significantly greater when the fungus *Verticillium albo-atrum* was

present. A paper read by R. Rohde, in conjunction with W. Lavellee, illustrated the initial migration of larvae and adults of *Pratylenchus penetrans* towards a tomato seedling. H. Goffart showed how the presence of certain nematodes in an oat-flour and agar medium was associated with an increase in the quantity of reducing and hydrolysing, non-reducing sugars. A paper by L. Roguska-Wasilewska showed that the presence of a high population of *Eucephalobus elongatus* affected the respiration rate of plants very little compared with a high infestation of *Heterodera schachtii*. A. Shepherd described the unusual hatching behaviour *in vitro* and in the field of *H. göttingiana* as compared with *H. rostochiensis*. K. Kuiper's paper emphasized how quickly the newly reclaimed polders were becoming infested with several common plant-parasitic nematodes. F. Call read a paper, produced jointly with N. Hague, on the relation between actual concentrations in the soil of ethylene dibromide and the kill of *H. rostochiensis*. S. Bingefors described the present breeding programme for the production of varieties of lucerne resistant to *Ditylenchus dipsaci*, C. Doncaster projected two films entitled "Predators of Soil Nematodes" and "Nematode Feeding Mechanisms".

At the General Meeting of the Society of European Nematologists, Professor B. G. Peters took the Chair. It was agreed unanimously to hold the next Symposium at the West of Scotland Agricultural College and Dr. J. Grainger was elected the new President. The Governing Body resigned and was re-elected as follows:—

Dr. S. Bingefors (replacing Dr. P. Bovien), Professor J. van den Brande, Dr. H. Goffart, Dr. J. Seinhorst and Mr. F. G. W. Jones, the last-named being co-opted to assist Dr. Grainger. The meeting also agreed to have a Newsletter which should be issued twice a year. Dr. K. Lindhardt accepted the Editorship provided he had the aid of local correspondents.

The Symposium banquet was held in the Castle of Laarne and this provided a memorable climax to a very successful and enjoyable meeting.

J. M. Webster

JOURNAL OF HELMINTHOLOGY

Edited by

J. J. C. Buckley, D.Sc.

William Julien Courtauld Professor of Helminthology in the University of London (London School of Hygiene & Tropical Medicine).

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Atakhanov, S. A.	1796	Boroda, C.	1379	Cefranov, N.	(1505)
Augustin, R.	(2035)	Bortagaray, C. A.	1331	Cerqueira Falcão, E. de	2066
Aykan, F.	1329	Bottini, A. C.	1332	Chabaud, A. G.	
		Bourgeon, R.	1333		1799, 1800, (1817)
Babero, B. B.	1797, 1939	Bowkiewicz, J.	(1326)	Chapman, R. A.	1655
Badalyan, A. L.	1546	Brancaccio, G.	1380	Chatterjee, K. D.	2089
Badran, A.	(1298)	Brangham, A. N.	1943	Chatterji, M. L.	(1330)
Baer, J. G.	1777	Brea, M. M.	1334	Cheng, T. C.	1901, 1946
Bailenger, J.	2016	Brenes, R. R.		Chernin, E.	1878
Bainbridge, J. R.	(2050)	1739, 1740, 1741, 1742, 1743		Chibichenko, N. T.	1846
Baines, R. C.	1651	Brewster, D. J.	(1549)	Chitwood, B. G.	
		Breza, M.	1504, (1511)		1656, 1657, 1801

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No.		No.		No.	
Chiu, J. K.	(1461)	Dobbin, jr., J. E. (1752), (1807)		Forenbacher, S.	(1486)
Chizhova, T. P.	1779	Dobrowolska, H.	(2025)	Forsyth, B. A.	2050
Chowdhury, A. B.	1980	Doby, J. M.	1981	Fortmeyer, H. P.	(1837)
Chuang, C. H.	1896	Dollfus, R. P.	1912, 1949	Foster, III, R. G.	1567
Chyla, M.	1911	Donà dalle Rose, A.	1663	Fotedar, D. N.	1805
Cicolini, J.	(1357)	Dorney, R. S.	(1520)	Foy, H.	1400
Cielezsky, V.	1484	Dorsman, W.	1485	França, O. H.	1401
Cimenti, R.	1457	Drăgușin, A.	(1510)	Frandsen, J. C.	1582, 1610
Clapham, P.	(2046)	Dropkin, V. H.	1881	Fraser, P. G.	1633, 1913
Clark, G. M.	1596	Drudge, J. H.	2047	Freeman, R. S.	1583
Claugher, D.	1879	Dubois, G.	1747	Freitas, J. F. Teixeira de	
Coelho, E.	(1827)	Dumeyer, W. H.	(1284)	1605, 1751, 1752, 1806, 1807,	
Cohen, R. H.	1530	Dupont, V.	1289	1808, 1914	
Coil, W. H.	1745	Dye, K. E.	(1595)	French, N.	1665
Colbran, R. C.	1658	Dyk, V.	1565	Friedman, E. A.	1295
Cooper, W. E.	1707	Dylikowska, L.	(1317)	Friedman, S.	1402
Cooray, G. H.	1547			Fromunda, V.	
Copp, F. C.	(2046)			1488, (1505), (1510)	
Cordero, R. L.	1284	East Africa	2095	Froyd, G.	1489
Correa, W. M.	(1566)	Eble, H.	1581	Fua, C.	1403
Cort, W. W.	2068, 2069	Edeson, J. F. B.		Fukamachi, H.	1404, 1532
Costa, F. J.	1458	(1849), (1966), (1967), (1968),			
Corteleer, C.	1390, (1490)	(1969)			
Coudert, J.	1285	Edwards, C. A.	1710	Galliard, H.	1405
Coughlin, J. W.	(1702)	Efremenko, V. P.	1711	Gamarski, J.	1339
Courtney, W. D.	(1706)	Ehrlich, I.	1486	Garabedian, G. A.	1340, 1883
Coutinho, J. O.	(1459)	Eichler, W.	2078	Garin, J. P.	(1406)
Couturier, A.	1703	Ellenby, C.	1882	Garkavi, B. L.	1548
Crandall, R. B.	1947	Elliot, A.	1337	Garnham, P. C. C.	(1852)
Crespin, J.	1391	El Nagah, A. M. (1290), (1297)		Gault, E. W.	(1450)
Crittenden, H. W.	(1897)	Elsdon-Dew, R.	(1436)	Georgescu, L.	1505
Czechowska, Z.	(1326)	Enari, T. M.	(1343)	Gerbaux, A.	1406
Czernik, A.	1392	Epps, J. M.	1712	Gerlach, S. A.	
		Epshtein, V. M.	1844	1650, 1809, 1810, 1811, 1812	
		Erasmus, D. A.	1748	Gersch, M.	1915
Das, K. M.	1802	Ergens, R.	1730	Gigitashvili, M. S. 1341, (1342)	
Dashiell, G. F.	1393	Errandonea, J.	(1331)	Gilardon, A.	(1334)
Davidson, J. H.	1708	Etges, F. J.	1749	Gilbert, A. B.	(1882)
Davies, A. M.	1394	Everard, C. O. R.	1804	Gilbert, D. R.	(1468)
Davis, R. A.	1659	Ewing, S. A.	1520	Gill, E.	(1550)
Dawes, B.	1948			Gilles, H. M.	(1418)
Debry, G.	(1305)			Gillet, J.	1611, 1860
Decker, H.	1660, 1709	Fain, A.	1750	Gindy, M.	(1614)
Defesche, A. J.	1286	Fargeix, A.	(1654)	Ginetsinskaya, T. A.	
De Leon, D. D.	1519	Farid, Z.	1290, 1291, (1297)	1847, 1950, 1984	
Delgado Flores, E.	(1740)	Faust, E. C.	1398	Giraldo, L. E.	(1398)
Delyamure, S. L.	1746, 1803	Febles, jr., F.	2048	Glover, M. A.	1296
Demidova, N. V.	2070	Fedorova, S. P.	(2079)	Goffart, H.	1724, 1916, 2067
Denizet, P.	(1654)	Feizullaev, N. A.	(1758)	Goil, M. M.	1985
Dennis, E. B.	(1710)	Feldmesser, J.	1982	Golikova, M. N.	1634, 1873
Depaillat, A.	1287	Feng, L. C.	2017	Golovin, O. V.	1612
D'Ercole, G.	(1466)	Fernández Bouzas C., A.	1399	González, C.	(1472)
Deschiens, R.	1288	Ferrari, T. J.	1664	Goodall, G. E.	(1651)
Desenne, J. J.	1395	Ferreira, J. M.	1292	Goplen, B. P.	1902
D'Eshougues, J. R.	1336	Ferri, A. G.	1566	Gordadze, G. N.	1342
De Silva, C. C.	1396	Ferri, L.	(1353)	Gordin, R.	1343
Dewhirst, L. W.	1880	Ferris, J. M.	1983	Goryachev, P. P.	1753
Dexter, H. L. T.	(1397)	Figueira, F.	1459	Goulson, H. T.	
Dexter, M. W.	1397	Figueiredo, J. M. P. de	1460	(1524), (1554), 2023	
Dias, C. B.	(1322)	Filizzola Filho, B.	1293	Govaert, J.	1903
Díaz Muñoz, A.	(1422)	Fiorillo, A. M.	1294	Gracey, J. F.	2051
Di Eduardo, A. A.	1661	Fisher, E. W.	1487	Graf, A.	1666
Diker, T.	1662	Fitzpatrick, S. C.	1338	Gragg, J. E.	(1536)
Dinulescu, G.	2077	Fitzsimmons, W. M.	1531	Greer, J. W.	(1290), 1297
Directo, A. C.	(1529)	Fletcher, R. B.	1478	Grégoire, C.	(1390), 1490
Dissanaiké, A. S.	(1590)	Flint, E. A.	1649	Grétillet, S.	1917, 1951
Djanian, A. Y.	(1340)	Folse, D. S.	2049	Grootenhuis, G.	1479

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Grundmann, A. W.	(1610)	Iyer, P. K. R.	(1513), (1514), (1515)	Kleinenberg, S. E.	(1746), (1803)
Guilhon, J.	1952	Izumova, N. A.	2019	Klimeš, B.	(1565)
Guimarães, J. P.	(1914)	Jackson, G. J.	2024	Kloss, G. R.	(1835)
Gupta, S. P.	1813	Jaiswal, G. P.	1756	Knight, R. A.	2054
Gürsel, A. E.	1344	Jalayer	1410	Kobayashi, A.	(1414), (1884)
Gusev, A. V.	1645	Jammet, M. L.	(1389)	Kolár, J.	1412
Halaša, M.	1613	Janowsky, C. C.	(2048)	Komiya, Y.	1413, 1414, 1884,
Halawani, A.	1298, 1614	Jansen, jr., J.	1584	1923, 1924, (1937)	
Hale, F.	(1519)	Jaroš, Z.	(1591)	Kóna, E.	1509
Hale, P. A.	1635	Jarrett, W. F. H.	2008	Kondi, A.	(1400)
Hallé, B.	(1289)	Jaurmin, J.	(1490)	Konicek, D. E.	1670, (1713)
Hamilton, J.	2052	Jefferies, H. S.	1960	Koos, L.	(1381)
Handford, S. W.	1299	Jelliffe, D. B.	1411	Kopvillem, K. G.	1671
Han-Kiu-Uon	(1326)	Jenkins, W. R.	(1659), (1897)	Korneev, A. P.	1585
Hansen, M. F.	(1880)	Jensen, H. J.	(1670), 1713	Korolinskaya, V. N.	1345
Harper, J.	(2043)	Jesus, Z. de.	1991	Kosheva, A. F.	(1950)
Harpur, R. P.	1986	Jeziorska, A.	2025	Kotarba, C.	2055
Harrar, J. G.	(2091)	Jimenez, F.	(1969)	Kotlán, S.	1492
Harrison, M. B.	1667, (1722)	Jiménez Millán, F.	1922	Kovács, F.	(1484), (1492), 1493
Hartwich, G.	1814	Jiménez-Quirós, O.	(1741), (1743), 1757	Koval, V. P.	(1585)
Hasan, R.	1636	Job, C. K.	(1450)	Kozai, I.	2056, 2057
Hashem, M.	1300	Johnson, M. A.	(1849)	Krall, E. L.	1726
Hearnshaw, G.	1549	Jones, B. V.	(1496)	Krasnolobova, T. A.	1963
Henderson, H. E.	1274	Jones, jr., J.	1597	Krilov, P. S.	1672
Hennessy, E.	(1436)	Jubb, K. V.	2009	Krishnan, K. S.	(1850)
Henríquez L., M.	(1528)	Juglair, jr., J.	(1376)	Krishnaswami, A. K.	1534, 1850
Hervada, A. R.	(1402)	Jung, R. C.	(1411), (2032)	Krotov, A. I.	2058
Hewitt, R.	1550	Kabatnik, J.	1521	Krusberg, L. R.	1673
Higashi, T.	1551, 1552	Kagan, I. G.	2026	Kuchařová, F.	1568
Higo, A.	(1544)	Kannan, S.	1818	Kumada, M.	(1413), (1414)
Hill, J.	(2043)	Kao, C. T.	(1461)	Kuntz, R. E.	(1589), (1625), (1745)
Hirschmann, H.	(1975)	Karassi, A.	(1363)	Kupriyanova-Shakhmatova,	
Hollis, J. P.	1668, 1987	Kariuki, L.	(1700)	R. A.	1760
Holló, F.	1615	Karmanova, E. M.	(1559), 1961	Kurelac, B.	(1486)
Holmes, J. W. H.	1480	Kasimov, G. B.	1758	Kurochkin, Y. V.	1761
Honer, M. R.	1953, 1954	Kassai, T.	1506, 1507, 1861, 2010, 2020	Kutsumi, H.	(1413), 1415, (1884)
Hopper, B. E.	1815	Kastak, V.	1637	Kuznetsova, O. A.	1346
Horváth, J.	1491, 1616	Katamine, D.	1304, 1533	Labess, M.	(1365)
Houel, J.	(1336)	Katiyar, R. D.	1508	Lacour, M.	1851
Hsieh, H. C.	(1896)	Katz, F. F.	1962	Lagraulet, J.	1526
Hsü, H. F.	1553	Keeling, J. E. D.	1992	Lamma, V.	1347
Hsü, S. Y. Li	(1553)	Keller, E.	(1666)	Lamy, P.	(1305)
Huang, W. H.	1461	Kelley, G. W.	1522, 1523	Lanna, P.	(1383)
Hussey, K. L.	(2068), (2069)	Kemple, H. M.	(1595)	Larsh, jr., J. E.	1524, 1554
Hutton, R. F.	(1774)	Kenya	2096	Lavier, G.	1465
Hynes, H. B. N.	(2087)	Kerr, J. A.	(2051)	Lawton, A. H.	(1397)
Ichioka, S.	1407	Kershaw, W. E.	(1502), (1549),	Lee, C. L.	2028
Iksanov, K. I.	(1734), 1955	(1557), (1560), (1561), (1562),		Lees, E.	1606
Imai, K.	(1544)	(1563), 1849, (1967), (1968)		Lefevre, M.	1617
Inglis, W. G.	1816, 1817	Keusséoglou, A.	1463	Le Golván, P. C.	(1301)
Inoue, S.	(1304)	Khalil, L. F.	1780, 1819	Leibersperger, E.	1820
Ishak, K. G.	1301	Khan, D.	1759	Lejtman, A.	(1439)
Ishida, H.	1302, 1754, 1755	Khodakova, B. I.	1464	Lenègre, J.	(1406)
Ishikawa, M.	1988, 1989	Khromov, A. S.	2079	Leonov, V. A.	1762
Ishizaki, T.	1408, (1413), 2018	Kim, C. W.	2027	Lepádatu, C.	(1575)
Ito, J.	1956	Kingsbury, P. A.	2053	Leray, C.	(1770)
Ito, Y.	1918, 1919	Kirkpatrick, J. D.	1669	Letey, jr., J.	(2000)
Ivashkin, V. M.	1957	Kiryanova, E. S.	1843	Le Van Hoa	(1800)
Iwakami, S.	1303, 1958	Kissel, P.	1305	Levashov, M. M.	2080
Iwańczuk, I.	1462	Kleijburg, P.	1725	Levin, N. A.	(1612)
Iwasaki, H.	1920, 1959, 1990			Levine, N. D.	2073
Iyengar, M. O. T.	1275, 1409, 1921			Lewert, R. M.	(2028)

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Lewis, D. J.	1852, 2081	Matov, K. P.	1888	Norman, L.	(2026)
Leytham, G. W. H.		Matuo, K.	(2065)	Novotny, H. M.	(1682)
(1549), (1560), (1562), (1563)		Mawson, P. M.	1822	Nurlu, F.	(1344)
Lider, L. A.	1674	Mazzitelli, L.	(1383)	Nusbaum, C. J.	(1683)
Liechti, H.	(1666)	Mazzotti, L.	1618		
Linchenko, I. F.	1348	Medrea, B.	(1363)	Odening, K.	1769
Lippi, M.	1466	Melissinos, K.	1351	Oei Hong Peng	1681
Listratova, V. N.	1638	Mendes, F.	1308	Oesterle, P.	(2034)
Liu, S. K.	1535	Menon, M. A. U.	1871	Ogawa, H.	(1414)
Lješević, Ž.	1494	Mercado, R.	1467	Okamoto, K.	(1544), 1863
Logachev, E. D.	1925, 1964	Merkusheva, I. V.	1587	Olivier, A.	1427
Löliger-Müller, B.	2082	Mettrick, D. F.	1782, 1783	Olsen, L. S.	(1522), (1523)
Londero, A. T.	1885	Meyer, F. P.	1641	Olteanu, G.	1619
Long, P. L.	1569	Michelson, E. H.	1862	O'Meara, D.	(1596)
Lownsbury, B. F.	1675	Mieres, A.	(1356), (1357)	Onabamiro, S. D.	1469
Lubinsky, G.	1555, 1926	Mikhnova, E. S.	2029	Onori, E.	1428
Lübke, R.	(1613)	Miki, T.	(1594)	Orlov, I. V.	1429, 1525
Lungu, V.	1510	Miller, J. H.	1421	Osborne, J. C.	1497
Lyaiman, E. M.	1639	Mills, A. R.	1679	Oshima, T.	(1543)
Lynsdale, J. A.	1781	Minton, N. A.	1309	Oshmarin, P. G.	1784
Lyon, H. H.	1886	Mirer, V. I.	1927	Osnes, M.	1430
Lyons, G. R. L.	(2081)	Misaki, S.	1468	Otten, E.	1537
		Mishalany, H. G.	(1766)	Ovnatanyan, K. T.	1431
Ma, S. F.	(2017)	Mishenina	1764	Owens, R. G.	1682
McCullough, F. S.	1276, 1965	Mitskevich, V. Y.	(1443)	Oye, E. van.	1432
McCullough, K.	(1284)	Miura, A.	1422	Ožegović, L.	1481
McGill, D. A.	1416	Molina Pasquel, C.	1570	Ozeretskovskaya, N. N.	1433
McGill, Jr., H. C.	(1594)	Molnár, I.	1352		
McGowan, T. F.	1417	Monteiro, R. C.	(1742)	Pacheco, G.	2032
McGregor, I. A.	1418	Montero-Gei, F.	(1885)	Padovani, P.	(1435)
McGuire, J. A.	(2054)	Moraes, L. L. de	1353	Pali, E. T.	1620
Machado, F., D. A.	1789	Morellini, M.	1680	Pan, C. T.	1864
Machado de Mendonça, J.		Moreno, A. F.	1889	Panabokke, R. G.	(1547)
(1808), (1914)		Moriarty, F.	1765	Paperna, I.	1642
Machulski, S. N.	1586	Morozov, F. N.	1588	Paramanathan, D. C.	1590
McIntyre, W. I. M.	(1487)	Morozov, Y. F.	(1525)	Parker, W. H.	1498
Madamba, C. P.	1887	Moskalev, B. S.	(1304)	Parys, O. van	(1495)
Mahon, J.	2083	Motomura, K.	1310	Pattanayak, S. P.	(1534)
Mai, W. F.	(1886), 1897	Moussa, K.	1766	Pattison, I. H.	2012
Makar, N.	1306	Mozgovoï, A. A.	1766	Pauer, T.	(1504), 1511
Makarenko, V. K.	1598	Mudzhiri, M. S.	1354	Paulo Filho, A.	1470
Makhlouf, A.	1349	Müller, G. L.	1928	Peacock, R.	(1496)
Maksimova, E. A.	1640	Mullins, J. C.	1536	Peláez, D.	1823
Malakian, A. H.	(1883)	Mulvey, R. H.	1929	Pellérdy, L.	1571
Malheiro, D. de M.	2059	Mumford, E. P.	1277	Pena de Grimaldo, E.	1556
Malmberg, G.	1731	Münnich, H.	2011	Pérez-Reyes, R.	(1823)
Mamedov, M. M.	(1464)	Murhar, B. M.	1599, 1767, 1768	Perri, A. M.	(2048)
Mañé-Garzón, F.	1763	Myers, B. J.	1589	Pessôa, S. B.	1312
Mankau, R.	1714, 1727	Myuge, S. G.	1993	Pester, F. R. N.	1313
Manson-Bahr, P.	2090			Peter, H.	1434
Marciniak, R.	1307	Nadakal, A. M.	1994	Peters, L. E.	1930
Marcu, M.	(1575)	Nadeau, F.	(1542)	Phillipson, R. F.	1557
Margolis, L.	1821	Nagatomo, I.	1423, 1424, 1853	Philpott, D. E.	(1910)
Markiewicz, K.	(2055)	Naimark, D. H.	2030	Picciochi, P. G. C.	(1904)
Markov, G. S.	(1603), (1604)	Nair, C. P.	1425, 1872	Pichardo Sardá, M. E.	1435
Marr, J. D. M.	(2081)	Nair, S.	1966	Pieczynska, E.	1996
Marsboom, R.	1495	Nakanishi, Y.	(2065)	Piétrí, H.	(1333)
Marsden, A. T. H.	1419	Naumov, D. V.	(1847)	Pigolkin, A. U.	1824
Marshall, G. M.	1676	Negrobov, V. P.	(1854)	Pigulevski, S. V.	2071
Martin, W. J.	(1668)	Nelson, A. M. R.	1496	Pillai, V. M.	(1871)
Martins, L. F.	(1566)	Nelson, G. S.	1311	Pinotti, M.	1314
Maslennikov, I. P.	1677	Nemeséri, L.	2031	Pinto, I. de S.	(1339)
Masseboeuf, A.	1350	New Zealand	2097	Pitchford, R. J.	1315, 1931
Mathur, P. S.	1420	Nivaldo, J.	1426	Plotnikov, N. N.	(1429)
Matossian, R. M.		Nötzel, H.	1715	Poláková, M.	1572
(1340), (1883)		Nolte, H. W.	1995		

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Polozhentsev, P. A.	1825, 1854	Roško, L.	(1613)	Shookhoff, H. B.	(1295)
Pop, M.	(1575)	Ross, J. P.	1685, 1716, 1997	Shrivastava, R. N.	(1438)
Popa, M.	(1363)	Roth, A. A.	1865	Shtein, G. A.	1856
Popova, T. I.	2072	Roy, R. G.	(1425)	Shumakovich, E. E.	1499
Porras, T.	1355	Ruehle, J. L.	1686	Shumard, R. F.	(1374)
Portalimov, G. T.	1890	Ruiz, J. M.	1827	Sicart, M.	(1908)
Potselueva-Sakhno, V. A.	1538	Ruiz Reyes, F.	1442	Sidorova, L.	1473
Poupard, L.	(1390), (1490)	Ryan, C. B.	(1567)	Silva, J. R. da	1320, 1321, 1322, 2037
Powell, N. T.	1683	Rybakowska, U.	1317	Singh, M. V.	(1437), (1438)
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